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SUDDEN OCCLUSION OF RETINAL ARTERIES*

CORRELATED FUNDUS PHOTOGRAPHS AND FIELDS IN BRANCH CLOSURES

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Retinal-blood-vessel changes are of vital importance to the diagnostician inasmuch as they supply evidence of the general vascular state of the patient, especially as regards the intracranial condition. These relationships are being studied by many, and because of unsolved problems will continue to be for some time.

An obscure phase is the sudden closure of the main retinal artery, which is, unfortunately, common. The object of this paper is to correlate fundus changes and gross field defects in branch obstructions, using for the first time, so far as I know, the combination of photographs and charts.

Some observers believe that all rapidly developing occlusions of retinal vessels are the result of a preceding pathologic alteration in the vessel walls. Others are convinced that in many of these cases an embolism is the activating agent. This does not mean that it is possible to differentiate it symptomatically from the slowly progressing narrowing of the vessel lumen with the terminal occlusion causing the signs of a primary sudden stoppage. Within a few hours of the visual disturbance a pale plug has been seen in the vessel, and is so distinctive in form, color, and location that lengthy argumentation is unwarranted.

The white, edematous, retina supplies an excellent delimiting structure for the photographic presentation of the region involved. The field defect is often outlined by a straight edge, but the swollen retina most often manifests a scalloped border. The macula may be impinged upon, but because of the thin retina, it cannot become so greatly swollen nor appear so intensely white as do the contiguous parts. The extent of the damage to the circulation is best seen during the early stage. The sclerosed, narrow blood vessel of a later period offers corroborative evidence of a previous obstruction. The value of photographs is further demonstrated when the retinal vessels are negative, but a closure of a branch from the accessory system produces a milky-white region in the otherwise normal retina.

A few cases are here presented.

J. C. N. (Plate I. fig. 1), a male, 44 years of age, was seen two weeks after he had had a slight dizzy spell that was followed by blurring of the vision of the left eye.

The vision of the right eye was 20/20; the pupil was 3 mm. in diameter, regular, and active; the media were clear, and the fundus was negative.

The vision of the left eye was 20/40; the pupil was 3 mm. in diameter, regular and active; the media were clear, and the disc, slightly oval, was distinctly outlined. The fundus vessels were of normal size and distribution, except for the subdivision of the lower branch of the central artery, which at its bifurcation showed a definite, small, circumscribed white spot at the apex of a broad, irregularly outlined, tongue-

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shaped, white area of severe retinal edema, the upper border of which partially surrounded the macula and gave off several rounded prolongations. The inferior margin followed the course of the vein for a short distance, and then widened into a broader patch before it finally faded into the periphery.

The interesting points about the field were, first, the sharp straight limiting line, and, second, the oval capping corresponding to part of the macular loss.

So far as was discoverable, the patient had no cardiac disease, and although his systolic pressure was 160, there were no gross arteriosclerotic changes.

L. H. (Plate I, fig. 2), a female, 42 years of age, had had heart disease for 24 years, a severe attack of influenza in 1918, and for the past week she believed that she had a recurrence of the influenza. A week ago she noticed a cloud before the right eye. Her systolic blood pressure was 180. The vision of the right eye was 20/200. The pupil was 3 mm. in diameter, regular and active. The media were clear and the disc edges sharply outlined. The upper half of the retina was edematous. The edema was greatest in the superior temporal quadrant, where the retina was cloudy and yellowish-white. Its border was crenated. The veins were practically normal in size and distribution. The inferior branches of the central artery were negative. The superior temporal branches, however, showed a distinct narrowing of caliber on the disc and for a slight distance beyond the edge. There was no marked constriction, beading, nor interruption of the blood current in the swollen region; near the disc the artery was collapsed. The field of vision showed a typical straight-line defect with retention of part of the macular area.

The vision of the left eye was 20/15. The fundus vessels were slightly sclerosed.

The patient died from cardiac failure about nine months after the examination.

B. R. (Plate I, fig. 3), a male, 64 years old, stated that three weeks before his first examination he had noticed the appearance of a cloud before his left eye. This was found to be due to an extensive detachment of the retina in high myopia.

About six months later he was reëxamined because on that morning, from 7:30 to 10:00 o'clock, he had been blind in his right eye.

Upon examination his vision was found to be 6/200; with —4.50 D. sph. ⊂ —1.50 D. cyl. ax. 135° it was improved to 20/20. The pupil was 4 mm. in diameter, regular, and active; the disc was oval, with a broad temporal conus and irregularly distributed pigment at the temporal side. The retina was negative except in the lower temporal quadrant, where the white edema was definitely confined to the distribution of the inferior temporal branch of the artery. There was marked irregularity in the diameter of the artery in this region with interruption of the blood stream and, in places, particularly near the inferior border of the disc a partial veiling caused by the retinal edema. There was demonstrable indenting of a branch of the accompanying vein. The macula was clearly outlined by its dark color, and by the partially encircling white zone. The field of vision showed a defect in the upper inner quadrant with a straight-line edge.

The eye was massaged and amyl nitrate administered, without effecting any perceptible improvement. The blood pressure was 122 systolic, 80 diastolic.

R. E. W. (Plate I, fig. 4), a man, 50 years of age, had never experienced any particular visual difficulty until seven weeks before examination, when there was a sudden clouding of the vision of the left eye; this condition continued unchanged. Two years before the attack he had had coronary thrombosis.

Vision of the right eye was 8/200. The pupil was 3.5 mm. in diameter, regular and active. The media were clear; the disc was pale with a large, deep, central excavation to the lamina. The nasal half of the nerve head was slightly obscured. The retina was translucent, and gave evidence of previous edema. Several glistening, white, pinpoint dots were located in and about the macula. The retinal veins were of normal size and distribution, although they were indented at the points where they were crossed by the arteries. The arteries in the upper portion of the fundus showed a very slight but definite increased reflex, a perivasculitis. The upper, inner quadrant of the field was preserved.

There were no heart murmers. The systolic pressure was 130.

M. A. (Plate II, fig. 1), a 75-year-old woman, was first examined two days after a blur appeared before her left eye. She had had no premonitory symptoms, and with the exception of a hypertension, systolic blood pressure 180, she presented no general physical abnormalities.

The vision of the right eye was 20/100. There was a slight indentation of the veins where they were crossed by the retinal arteries; otherwise the fundus was normal.

The vision of the left eye was 5/200. The pupil was 3 mm., regular, and reacted actively to light. The media were clear. The nasal and inferior borders of the disc were hidden beneath the translucent, thick, white retina. Almost half of the fundus was affected; the condition involved the nasal side and extended below the disc border, partly encircling the macula and fading into the temporal periphery. This region was definitely elevated. The

arteries were narrowed, being extremely small in places, with an interrupted blood stream. The veins were slightly distended; both the arteries and the veins were devoid of the central reflex.

About two months after the primary closure the vision was 20/200, with a faint milky haze in the region of greatest edema. The field, as the chart records, was that of an almost horizontal hemiopic defect.

S. D. (Plate II, fig. 2) a male, aged 47 years, four days before examination complained of seeing a shadow before his right eye. So far as he knew, he was perfectly well and not conscious of any physical defect; nor was any found on general examination.

The vision of the right eye was 20/70; with a —50 D. sph. ⊂ +1.50 D. cyl. ax. 180°, the vision equalled 20/40. The pupil was 4 mm., regular, and active. The media were clear, and the disc was almost round, with a small central excavation. The upper half was veiled by the edematous white retina, but the lower portion was clearly visible. The lower divisions of the retinal vessels were negative. The upper divisions showed an increased reflex from the artery wall, definite indentation of the vein, and a corresponding extensive edema of the retina. The lower limits of the edema were at a measurable distance from the macula and the edge was not straight. The field of vision showed marked contraction with retention of the macular area.

A. S. (Plate II, fig. 3), a male, 39 years of age, had suddenly lost the vision of the left eye three hours before examination.

The vision of the right eye was 20/20. The pupil was 3 mm., regular, and active; the media were clear; the disc was distinct, and the fundus was normal.

The vision of the left eye was 10/200. The pupil was 4 mm., and reacted sluggishly to light. The media were clear. The fundus was of a dull, dead-white color. The edge of the disc was dimly seen through the cloud; the inferior temporal border was sharply outlined. The arteries on the disc were very narrow; the blood stream was interrupted, and the wall-reflex decreased. The veins were negative, neither tortuous nor indented. The only unaffected portion of the fundus was an oval, slightly oblique zone that included the macula and a portion of the disc. In this area the retinal vessels were normal and the color was normal. The upper margin of the macular region was cloudy, but otherwise the macula was unchanged in color and outline. There was a retention of the central field, and a small, round-edged extension.

There was no cardiac lesion and the systolic blood pressure was 115.

M. N. (Plate II, fig. 4), a 63-year-old male, was first examined three weeks after the sudden loss of vision in the right eye. His history showed that for many months he had had hyperpiesia, and a year before he had lost control of his left arm.

The vision of the right eye was light perception. The pupil was 2.5 mm., regular, and active. The media were clear. The disc was slightly oval, with a faint smokelike haze overlying the nasal half. With the exclusion of the macular region, there was a diffuse gray-white clouding of the retina which was thicker in some places than in others. The retinal veins were about of normal size and although invisible where they were crossed by the arteries, they were not indented nor pushed aside, but merely covered by the white artery wall. Some of the arteries were normal, others showed an uneven lumen, and still others had definite interruptions of the blood stream and distinct beading.

The vision of the left eye was 20/50, corrected to 20/20. Externally the eye was the same as the right. The veins were slightly distended and compressed where the arteries crossed them, but otherwise the fundus was normal.

The right field was much contracted.

Five months after the photographs were made the patient died from a cerebral vascular accident.

A critical analysis and careful inspection of the photographs and fields show:

That there is a definite straight-line field defect, even when the edematous retina presents a crenated border.

That the macula may be partly encircled and yet central vision be retained.

That an embolus may be visible at the apex of the region of white retinal edema which coincides with the part of the retina supplied by that particular artery.

That a field defect suggesting a raphe is present, is readily recognized, and has been frequently recorded.

The review of the cases here presented shows:

That the majority of patients have complained of sudden loss of vision without premonitory obscurations.

That some occlusions are definitely coincident with cardiac disease and others with hypertension.

That after a vessel has once been occluded it seldom, if ever, reopens, but remains as a visible white line.

This subject is presented with the expectation that the combined method of paralleling photographs and fields will be universally adopted, so that more definite information can be obtained regarding the part of the retina supplied and the decrease of its function following the lack of nourishment. The advantages of this plan are many, for all clinicians can use it, therefore more cases will be observed and more accurate deductions finally drawn; whereas, if our reports are confined to pathological examinations, they are almost always made long after the vascular accident has occurred, and the eyes usually exhibit other degenerative changes. The former scheme here suggested offers immediate direct evidence, whereas the older method gave delayed, sometimes conjectural, conclusions.

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LECTURES ON CATARACT

III. Anterior-segment and other complications in the postoperative period

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Incarceration and prolapse of the iris

The consideration of iris herniation differs somewhat in intracapsular and capsulotomy cases.

A. In *intracapsular* cases the extent of herniation may be: (1) Incarceration in the deep wound. (2) A covered prolapse. (3) An exposed prolapse (not covered by the conjunctival flap).

In the first two cases, or in minor degrees of the last, our immediate treatment is eserine, sedatives, double bandage, and purgation. The eserine is pushed freely and in part exhibited as eserine and iodoform ointment. Not infrequently this reduces the prolapse sufficiently to allow the deep wound to heal without apparently nipping the iris tissue, although there may be an anterior synechia. Sometimes this treatment has to be persisted in for over a week. If the covered prolapse does not move after a reasonable trial of eserine, we have effectively used the following procedure:

A small keratome incision is made at the limbus below the horizontal diameter, or the flap undermined near one angle with a thin flat repositor, and gentle replacement of the iris effected by getting above the prolapse with the repositor, which is then carried downward with a sweeping movement.

Obviously such a treatment must be carried out with the most delicate technique. Otherwise the vitreous may be disturbed and prolapsed through the pupil. The exposed prolapse may be dealt with somewhat similarly, by undermining the conjunctiva and freeing it from above and behind to start with, and if necessary putting in a point of suture in the flap aperture.

I need hardly say that if the vitreous has already found its way around the pupillary border and is itself engaged in the section in a plane anterior to the iris, such a line of attack would be courting still further trouble. I am speaking of prolapses associated with vitreous, or aqueous behind the iris; that is to say, where the vitreous mushroom through the pupil, if there is one, does not take part in the iris hernia. Should such a technique succeed—and it sometimes succeeds wonderfully, restoring a circular pupil with the aid of miotics—all is well. But in large, exposed prolapses, it is often too

bold a step; and here we cannot do better than to cover the prolapse with a conjunctival flap.

A retrobulbar and orbicularis block is established, as for extraction, and the field of operation thoroughly cleansed. The prolapse and neighborhood of the wound are dried and touched with tincture of iodine. Novocaine with adrenalin is injected subconjunctivally to balloon the conjunctiva, which with knife or fine scissors is then cut close to the prolapse and freed as far as the horizontal diameter on either side. The conjunctiva is freely undermined. From the extremities of the original semicircular cut, short incisions are made about 4 mm. temporalwards and nasalwards at about 30 degrees above the horizontal.

We prefer this apron flap and invariably cauterize the prolapse and the corneal lip of the wound lightly, in order to create a granulation-tissue surface and ensure its adhesion. The angles of the flap are buried on either side as in a pterygium operation. It is obvious that a prolapse in an intracapsular operation may be a more serious thing than a prolapse in a capsulotomy, for in the former one cannot be certain that there is not vitreous immediately behind the prolapse, and excision or cauterization of such a prolapse immediately produces loss of vitreous.

Variations. It may be, of course, that the vitreous face is not involved at all, or that it may be herniating into the prolapse but not incarcerated in it. However, we dare not take liberties with such prolapses unless we are sure of their relation to the vitreous.

B. In *capsulotomy* cases we at first treat the anterior adhesions of the root of the iris to the back of the deep wound, incarcerations, and covered prolapses in the same way as previously outlined; that is, we push miotics. An exposed prolapse may be excised or replaced according to its size and nature. We do not consider that there is any real danger in the reposition of a knuckle of exposed iris if due precautions are taken to cleanse the field of operation thoroughly, touch up the lips of the wound with tincture of iodine, and also use a fine iodoform powder. It is surprising how well even large prolapses may be replaced and a round, active pupil obtained. In many cases, however, incarceration is so thorough that such a procedure is out of the question. This is easy enough to determine when one explores the prolapse. In such cases one may either cut away the iris tissue and cover with a flap, or cauterize the iris tissue and cover with a flap.

Disadvantages and Dangers of These Complications.

A. *Intracapsular cases.* (1) (a) The interference with vision due to loss of the iris diaphragm.

(b) The loss of influence of a round movable pupil. It is a very great advantage to have a round movable pupil after an intracapsular operation, because of its control of the vitreous face.

(2) Anterior adhesions of the vitreous. In cases of prolapse near the root of the iris, the vitreous may or may not form an adhesion in the iris herniation. If the iris is incarcerated, the vitreous behind it may also become incarcerated; as, for example, when it pushes through at the buttonhole, carrying iris with it. It may also become incarcerated in a peripheral hernia away from and free of the buttonhole.

Alternatively, the vitreous face may merely herniate freely into the prolapse. This is of no consequence in so far as the vitreous is concerned, but a definite adhesion of the vitreous in the neighborhood of the iris root may give rise to an irritable eye.

The problem is different if the vitreous instead of pushing the iris in front of it comes round the pupillary edge and takes part with the iris in the incarceration or herniation.

In the former variety, as mentioned, it may be nipped, and irritation, local congestion, and inflammatory and proliferation changes which eventually lead to serious complications may originate from this point. This is much more likely to happen, however, if the vitreous rounds the pupil edge and both are caught up to the deep section with the vitreous in front.

We push miotics in the hope that lesser degrees of such impactions will improve, and the contraction of the pupil tend to free the wound.

(3) Progress of the more marked and complicated degrees of vitreous-iris adhesions. Larger compound adhesions give rise to a marked haziness of the cornea, radiating from the adhesion. Later on, organization, starting in the neighborhood of the impaction, spreads back into the ciliary body and vitreous.

There is a low-grade or subacute inflammatory reaction, and adhesions with the iris are formed. Eventually, the fine opacities which radiate at first from the neighborhood of such an iris-vitreous adhesion form a dense scar-tissue focus with an organized vitreous face and an "after-cataract" membrane. Still later, one may get detachment of the choroid or retina, due to contracting fibrous tissue.

In wide prolapse of the iris, or vitreous, or both, glaucoma may supervene. The astonishing thing is that such an eye will become quiet; many of them do eventually. Marked irritation may, however, be present for a considerable time, and even small forward adhesions of iris and vitreous can give rise to a persistent red eye, ciliary congestion, and recurrent irritation.

Vitreous alone incarcerated in the section without iris prolapse, or iris without vitreous, produces like results, but hardly to such a degree as do compound incarcerations.

B. *Capsulotomy cases.* Prolapse of the iris is associated with a loss of the optical advantages of a round and active pupil. The influence of the round movable pupil on the vitreous face does not apply, since the vitreous face is controlled by the capsule zonule diaphragm. Nor do we after capsulotomy have to contend with a wedge of vitreous lying behind the iris prolapse, or rounding the pupil border to engage with it in the adhesion, so that the disadvantages just mentioned as associated with the vitreous are not necessarily met with as postoperative complications of iris prolapse in capsulotomy.

We do, of course, occasionally meet with capsulotomy cases in which the patient in the postoperative period presents a herniation of the vitreous through the zonule; in other words, our zonule-capsule barrier has given way before a vitreous thrust, and put us in the same position as if we had a compound prolapse in an intracapsular operation.

After both intracapsulars and capsulotomies, the simple herniation of the iris alone—quite apart from the added trouble of a vitreous adhesion or compound hernia—unless reduced without impactions and incarcerations, or permanent extrusion of uvea through the lips of the deep wound may be followed by:

(1) Immediate irritability and quiet iritis.

(2) Late recurring irritability and iritis. The impaction may result in a weak fistulous scar, sometimes of a bulging or staphylomatous type, which renders the eye susceptible to recurring inflammatory attacks. This is more likely if the prolapse is not covered with conjunctiva, as may well be when it occurs near the angle of the section where a mere mar-

ginal flap of conjunctiva is present.

(3) Late septic infection. This, I believe, deserves at least as much attention as that given to late infection after trephining, since we see probably as much of one as the other. We consider that it is associated with exposed iris and a weak scar, and hence we try to cover irreducible iris herniae.

(4) Secondary glaucoma. This complication need hardly be discussed in detail. Sometimes a filtering scar tends to stave it off. It is a graver problem than the secondary glaucoma due to anterior adhesions in an eye from which the lens has not been removed. It may be dealt with by a decompression below, of a Lagrange type.

(5) Sympathetic ophthalmia. Sympathetic ophthalmia, in our experience, is uncommon. We have seen it, or what we took to be sympathetic ophthalmia, as a complication of cataract extraction, but so rarely that we do not bother about it. An interesting thought here is that we may possibly see less trouble of this sort because we are very apt to give our patients large doses of aspirin or the salicylates, when we become aware that the uvea is involved in the section, or otherwise disturbed, or there is any evidence of uveitis or ill-defined irritation whatever. I have seldom seen the classical massive sympathetic ophthalmia in Indians, and the milder varieties that have been observed behave more like allergies than infections under treatment.

Treatment.

Common methods adopted in serious uveal inflammations—for instance, of a sympathetic type—may be indicated briefly here:

Intravenous neosalvarsan, intramuscular hypoloid bismuth (sometimes Donovan's solution and potassium iodide by mouth).

Serum (anti-diphtheritic, or other available horse serum) 15 c.c. daily for a week and continued according to the patient's reaction. First test for hypersensitivity and if necessary desensitize.

Iodine intravenously, a solution of 6 grains of iodine and 6 grains of potassium iodide to an ounce of water is used in 20-minim doses.

Sodium salicylate, 1 gr. per pound of body weight. Sodium bicarbonate is exhibited with this.

Deep intraorbital cyanide-of-mercury injections 1/2000 up to 5 minims, combined with an equal part of novocaine.

Foreign protein—milk injections intramuscularly, or T.A.B. vaccine subcutaneously or intravenously.

Blue pill at night followed by a saline purge in the morning.

Leeches, atropine, dionine, adrenalin.

As many of these methods as reasonable are combined as early as possible, in as large doses as it is considered the patient will stand, and continued according to judgment and the progress of the case. In potassium-iodide intolerance, sulphanilic acid is used—half-percent water solution, an ounce every two hours—repeated one or two days if necessary. In arsenic intolerance, Ametox is given—0.45 gm. the first day, 0.5 gm. the second, 0.75 gm. the third, and 0.9 gm. the fourth day. This is a rough indication of some of the means employed. Details may be gathered from the literature; as, for example, the serum administration is based on Verhoeff's method.

Iritis

A. From no obvious cause (without iris involvement in the section). There seems to be no doubt that the mild exuda-

tive and inflammatory responses, such as we are accustomed to associate with a red or irritable eye, are more likely to be encountered after capsulotomy. But even after intracapsular cases and after capsulotomies in which lens products have been washed absolutely clear and there are no anterior adhesions of iris, capsule, or vitreous, we may get insidious iritic phenomena. The mere fact of operating on an eye may be sufficient to start up some unknown latent factor. It seems useless to speculate as to cause, when the etiology of iritis is largely an accumulation of unproved hypotheses. We have given up blaming teeth and tonsils, or falling back on other varieties of focal sepsis; that is to say, local action determined by a circulating bacterial toxin or bacteremia developed at an extraocular site, or lighting up of latent organismal invasion. These—which we may care to regard as tissue-selective phenomena, bacterial-allergic phenomena, or immediate infections of the wound—are all possible; but trauma to lens and iris alone without these is apparently capable of setting up an iris reaction of an immediate inflammatory or allergic type. Where such a purely local action is effective it does not profit much to look further afield, unless indeed there is some infective condition calling for rectification. I do not, of course, refer to iritis as an early stage of local pyogenic infection of the wound, which soon becomes fairly obvious. Treatment is empirical and based on the general plan of that previously outlined for a sympathetic condition but diminished in variety and extent.

B. Iritis phakoanaphylactica. This seems to be a well-established and easily recognizable condition. Its exact explanation need not be gone into; the problem is familiar. When the cortex can be washed away, gently and completely, I do not believe the empty capsule continues to act as an irritant.

In all capsulotomy work, even the temporary exposure of the iris face to cataractous material may give rise to slight irritation; but this is evidently quickly relieved by atropine. Pieces of cortex if left behind continue the supply of irritant and evoke inflammatory response.

C. Associated with prolapses and impactions of iris and vitreous (already mentioned).

D. Sympathetic (already mentioned). Treatment of iritis in general, including septic infection of the wound.

If no obvious local cause is observed and irritation is mild, aspirin, 10 grains three times a day, is given, the bowels are opened with blue pill and saline purges, atropine is pushed, iodine given intravenously, and leeches and heat applied locally.

The same procedure is adopted if there is reason to think the nature of the iritis is due to lens matter. Treatment is much more intensive if the iritis is more severe, and other methods are resorted to. Should there be anything of the nature of a sympathetic involvement the treatment is pushed to the fullest extent, as previously suggested.

Pyogenic infection and panophthalmitis

Iritis with infiltration of the section, or hypopyon. In the first few days any evidence of exogenous wound infection by pathogens is dealt with by very energetic measures, including milk injections, organic arsenic, heat, leeching, blue pill, saline purges, and so forth; in fact, the same type of comprehensive empirical treatment that is adopted with the type of iridocyclitis which we regard as more suggestive of sympathetic ophthalmia. Morphia and leeches are valuable for the pain. In spite of anything we may do the infiltration of the section may in-

crease and the aqueous become turbid, following which an increase of redness and pain with chemosis and pus in the chamber indicates impending or actual panophthalmitis.

Anterior iris synechiae of minor degree. Points of adhesion between the edge of the buttonhole, the angles of the coloboma, or the collarette and the back of the cornea do not, in our experience, give rise to much trouble, although indeed they sometimes determine the persistence of a shallow anterior chamber or a point of corneal opacity. Such must be recognized and the adhesion broken down early. Ordinarily, fine points of anterior synechiae are automatically broken down as the iris movements are established and they disappear in time, except those in the neighborhood of the section near the root of the iris, which frequently persist. These may be observed in complete iridectomy, iridotomy, or even in simple extraction if carefully sought. I doubt if they do much harm, but they are favored by atropine and are less frequent in intracapsular work. As mentioned elsewhere, remnants of blood clot lodging towards the angle are liable to establish points of peripheral anterior synechiae.

Pure vitreous impactions in the section

Such a complication is referred to here for the sake of completeness as a possible postoperative event. It is obviously more likely after an intracapsular extraction, and with a complete iridectomy rather than a buttonhole. The consequences have been discussed to some extent already.

In pure vitreous escapes, where the iris is not drawn into the section but turned back, repair is attended on the whole with less inflammatory evidence, less redness, less irritation, and slower proliferative activity. Surely, however, proliferative activity sets in, the evidences of which may be seen in the dense opacification of the section, the fibrillar streamers in the vitreous hernia and on the vitreous face, and the gradual upward pull in the ends of the hammock-shaped pupil.

Such eyes may remain useful for years. It is a relatively common sequel of expression, in certain parts of India. The late results of such an impaction may be very similar to those referred to under compound impaction, but the vitreous face may, on the other hand, remain clear.

Pure but lesser vitreous impactions. Threads or bands reaching from the vitreous face may set up a profound irritation. They must be remembered in doubtful cases of persisting red eye. They are naturally seen more often after intracapsular extraction, or removal of capsule after a capsulotomy.

In intracapsular cases in which the pupil is contracted early, such strings reaching from the vitreous face produce a notched or pear-shaped pupil.

A notched pupil should be examined with the corneal microscope, to distinguish between a point of peripheral anterior-iris synechia and a thread or band crossing the pupil edge. The former may be left alone, the latter should be dealt with by dividing it, since it is more liable to set up recurring irritation.

Let me say here that all eyes, even quiet eyes, should be examined with the corneal microscope after cataract extraction. Delayed onset of poor vision, attacks of irritation, and even of glaucoma, which are sometimes put down as mysterious, may be sometimes anticipated from the conditions observed.

Late gaping section

Gaping section has been touched upon as a complication on the table. Owing to an increasing volume of the posterior segment, a gaping section in the early postoperative period is also seen, with-

out any great disturbance of the iris but with a general forward movement of the posterior segment. Gaping section is much better let alone at the time of operation, but if the gaping is observed for the first time just after operation and there is no obvious cause, purging, leeches, eserine, and pressure bandage constitute the course adopted.

Corneal opacities, so-called keratitis

It is convenient to think of such under three types or as of three degrees: 1. Associated with change in the endothelium. 2. Associated with change in Descemet's membrane. 3. Associated with change in the substantia propria. Naturally they may all be, and often are, involved at the same time.

In addition to the common evanescent form of striped keratitis in which there is a haze denser near the wound, tailing off to clear cornea below, and showing vertical stripes or lines, we may find an isolated dot of deep haze, diffuse discs of deep haze, striped haze in quadrants other than the superior quadrant, or a light generalized haze with geometrical markings above and towards the center at any time in the first week after operation.

The linear markings of striped keratitis are due to a folding of Descemet's membrane, but some of the lesser opacifications may not necessarily show linear markings, and points may presumably be due to disturbance of the endothelium alone. Some of the denser opacities are obviously in the substantia propria; at first edematous, then proliferative, and finally cicatricial.

As we shall see later it is a very easy matter to get a large detachment of Descemet's membrane, and the denser types of keratitis are easier to understand in view of recent observations which I have made in connection with stripping of Descemet's membrane at the time of operation. For the moment, however, we will content ourselves by thinking that the more severe types of striped keratitis are concerned mainly with changes in the substantia propria and in Descemet's membrane, while some of the lesser opacities may be concerned only with the endothelium.

The various types of opacities encountered in the postoperative period are:

A. (1) Striped keratitis radiating from section, due to slipping or rucking of Descemet's membrane produced at the time of making the section—a bad section.

(2) Keratitis with an actual detachment of Descemet's membrane at the time of operation, a further degree of (1) as evidenced by the dull deep haze radiating from the section. This may possibly be more common after the use of the irrigator, but may also be produced by any penetrating instrument.

B. Adhesion of a point of iris tissue (apart from the keratitis associated with gross herniae, uveal, vitreous, and compound), such as at the edge of a buttonhole, the stump of an ordinary iridectomy, or the angles of the coloboma of an ordinary iridectomy.

C. A point of capsule may be caught forward anywhere, less commonly found if there is a buttonhole iridectomy and a round, well-contracted pupil. Also less common if we do not shred the capsule.

The best way to avoid this is by clean removal of the capsule center and by making a peripheral buttonhole and contracting the pupil with miotics, if long shreds tend to float up.

D. Vitreous adhesions of different types. (1) In intracapsular cases, if the vitreous is degenerate a large mushroom may touch the cornea at some point and

adhere, giving rise to a patch of diffuse haze not necessarily towards the section.

(2) When for some cause the anterior chamber does not form reasonably soon and the normal vitreous mushroom makes contact with the endothelium.

(3) A thread of normal vitreous may follow the delivery of the lens or total removal of capsule which remains caught to the section and attached by its other end to the main mass which falls back.

E. Shallow chamber with endothelial contacts. Iris or other tissue lying against the endothelium for some time is apt to set up a haze, without a definite adhesion.

F. Irrigating the chamber with an irritant or nonisotonic fluid at the time of operation, or entry of irritant fluids into the chamber at the time of making the section, touching the endothelium roughly or with instruments that are not smooth at the time of operation will produce a haze.

G. Horizontal linear markings of the cornea. (1) Due to folding the section over, as is frequently done by some as a routine procedure. This may leave a transverse fold of Descemet's membrane relatively clear or associated with a diffuse linear opacity. (2) Too small a section with difficult delivery causing a taut kink between puncture and counterpuncture. (3) A superficial epithelial linear marking opposite the palpebral slit.

So much for the opacities that one observes quite apart from the classical striate keratitis in the upper quadrant. Sometimes it is difficult to say why an adhesion to the endothelium of a tag of iris, capsule, or fibrin takes place; presumably trauma of the endothelium predisposes, but continued apposition even without trauma may be effective. All opacities of the cornea in the postoperative period whether contiguous with the section, or elsewhere, should be carefully examined with the loupe or microscope.

Stripping of Descemet's membrane

Quite recently I became aware of the fact that it was possible to strip Descemet's membrane completely off the back of the cornea. This opened up a new vista of possibilities in connection with these striate and other varieties of keratitis which we may come across. If looked for very carefully, in some cases the edge of Descemet's membrane is observed to float free as a tiny semilunar flap, if let alone it sinks back, but it may be seized and stripped, if mistaken for a fine tag of capsule. It is not likely that a detachment of Descemet's membrane will be observed without effective operating glasses, and its movement in the stream of the irrigator aids detection.

Effect of a detachment. (1) It may go back into place with moderate haze and definite folds, or

(2) It may not attach so well, in which case the denser opacities associated with exposure of the substantia propria to aqueous are produced.

(3) Even if Descemet's membrane is removed the cornea may clear to a remarkable degree. I have not seen the endothelium grow over but believe it does.

(4) A synechia with detachment is worse than a simple detachment, since there may be proliferative changes and organization in the deep layers of the substantia propria.

Treatment of synechiae and impactions.

1. Minor synechiae may be divided after a short time by methods which will be described later.

2. Larger impactions are better let alone till the eye becomes quiet. If and when it does, any question of visual improvement by operation may be considered.

Shallow chamber

This is one of the annoying complica-

tions in the postoperative period; it may be due to:

A. Leaking section.

(1) Leaking from the start. Possible causes of leak are: fibrin, capsule, iris, or cortex in the section; irregular apposition; a bad jagged-faced section; spasm; and entropion.

(2) A subsequent emptying of a formed chamber due to trauma, sudden starting movements, coughing, sneezing, and so forth.

(3) An open deep wound: sometimes when the deep section remains wide open while the cut edge of the conjunctival flap heals and the flap balloons. The aqueous may escape at a point from under the flap followed by a sudden emptying of the chamber. In such cases the bandage is retained till the deep section heals and the flap adheres throughout.

The deep section may remain open thus for days with a well-filled chamber, but it gradually closes. It is always better if the deep section closes at once, but the above is not serious.

B. Indolent section. In old decrepit people, or in cachectic conditions, the tissues make no attempt to heal, even though the section is good.

C. Detachment of the choroid. It is possibly more common in intracapsular cases, but this is not certain. It is more difficult to diagnose in capsulotomy. It is easy to see with the naked eye in intracapsular extractions, by throwing the beam in obliquely and looking along it. Our figures do not show a greater frequency in intracapsulars, over a small carefully observed range; in fact, in a recent series the reverse was true, but figures in this connection are not reliable.

If detachment is observed, or if no other cause for shallow chamber is observed and the eye appears otherwise to improve we treat the case as if choroidal detachment were present, by deep cyanide injections, dionine, blue pill, saline purges, pilocarpine. Should the chamber not form, or, in the event that it does form, should the detachment persist, treat with scleral diathermy and puncture or with scleral trephining and choroidal irritants.

D. Shallow chamber of unknown origin. Sometimes no associated cause is obvious. There may be a failure of aqueous formation or possibly a posterior-segment forward displacement, associated at first with a leaking section and finally established either by actual peripheral synechia, or cohesion without synechiae between iris and cornea. For such we have for years adopted filling the chamber with McKeown's narrow pipe through a needle or keratome incision. This sometimes stops the trouble and starts up the chamber with a normal disposition of parts. If this fails and a posterior-segment increase in volume is established with tension, cyclodialysis may be successful as tension supervenes. The spatula may be entered through a 1½-mm. trephine aperture in the sclera, rapidly and safely made with a mechanical trephine.

E. Anterior synechiae. An obvious point of discrete iris or capsule synechia if resistant to miotics or mydriatics may be broken down with a spatula through a very small keratome incision; the iris falls back immediately as a rule. Peripheral synechiae of a partial ring type, due to angle clot at the time of operation, are more difficult of recognition and treatment.

F. Hemorrhage into posterior segment, free in the vitreous or otherwise, retinal or choroidal. This is diagnosed with the ophthalmoscope: it may be followed by glaucoma.

Treatment of shallow chamber in general.

Some points of anterior synechiae are first treated by pushing atropine, or miotics, according to the site of the adhesion

before dealing with them surgically. In leakage of the section not associated with impactions, silver nitrate (3 gr. to one ounce), dionine, or heating the section may be useful.

In leakages with impactions miotics are pushed, the bandage is retained, and the patient purged. If there is irritation and the patient is inclined to squeeze, leeches and hot compresses are useful. Precautions against trauma, cough, sneezing, must be adopted; and old decrepit patients nursed and stimulated. If there is spasm and entropion release the eye, use a shield, and adopt some measure for everting the lid. Canthotomy may help, but a few subcutaneous lines of cauterization radiating from the lower-lid margin for about 6 mm. is more effective. The subcutaneous tunnels for introducing the cautery point are conveniently made with a Graefe knife.

Marked hypotonus of unexplained cause. Collapsed globe with a healed section is occasionally met with, in old decrepit patients. Eventually after a long convalescence normal tension is resumed. Treatment by atropine, dionine, and deep cyanide injections is resorted to.

Sliding section—gross astigmatism

Sometimes the anterior face of the deep wound instead of healing in apposition slides a little to one or the other side and heals in a false position. This produces a redundancy in one or the other angle, and a gross corneal irregularity with a consequent error of refraction. Quite apart from such a more obvious healing in false position astigmatism may occur even in an apparently perfect section.

Hemorrhage into the anterior chamber

As a postoperative complication this is not uncommon (over 10 percent, some years as much as 20 percent).

A. Possible associations are: Diabetes (most important), arteriosclerosis.

In hospital practice: Overcrowding, indifferent nursing, patients disturbing the dressing, trauma of any sort (sneezing, coughing, straining).

B. The hemorrhage may come from:

(1) Deep vessels in the corneo-scleral wound held open by the rigid walls of the deep section which bleed under the flap or into the anterior chamber. Such vessels are sometimes noted at the time of operation, but may bleed later.

(2) Vessels of subconjunctival region.

(3) Vessels of the iris are apt to bleed in certain rigid irides, and in those with diseased vessels (arteriosclerosis, diabetes); more commonly perhaps in Indians. The normal iris does not bleed.

C. Various types of postoperative anterior-segment hemorrhages: (1) A slight hemorrhage into the anterior chamber without displacement of section or injection of flap—pupil visible—hyphema.

(2) Chamber full of blood and clot, or laked blood; no iris visible; deep section still holding.

(3) Same as above; deep section open and the flap injected.

(4) The section and flap somewhat elevated and clot projecting; the cornea somewhat buckled; expulsive hemorrhage from the anterior chamber.

The clot may be gently removed, but only in part from the lips of the wound. Too free removal may start fresh bleeding. It is only a more extreme degree of the three first named.

How to deal with hemorrhages.

At the time of operation (dealt with under complications on the table.)

The postoperative hemorrhage is very often best let alone; unless a large clot gapes the section and obviously requires careful removal, nothing is done for days.

In diabetics calcium is administered.

Pilocarpine is used locally if the case is intracapsular. Sometimes even in extracapsular cases we give pilocarpine. The hemorrhage of an oozing type may recur repeatedly. If so, it is undesirable to allow deposition from such hemorrhage and the risk of secondary glaucoma. After a reasonable time, say a week, if the hemorrhage is not absorbed or should it have recurred, we adopt a more active policy of giving the patient intravenous calcium, normal horse serum, or hemoplastin, and perform a paracentesis with a keratome. If this does not answer, if the oozing recurs after the bloody material is evacuated, or if the paracentesis reveals a dark, tarry clot, adherent to the face of the iris, we introduce a suitable forceps and with a wide grip pull the clot carefully out, then gently irrigate the chamber. It is surprising how often this winds up an otherwise tedious affair.

Owing to the susceptibility of the diabetic to hemorrhage, it is advisable to make a smaller conjunctival flap or a narrow bridge, should capsulotomy be adopted, and minimize all operative trauma.

Some of these hemorrhages may be very tedious, and we have seen secondary glaucoma intervene after repeated hemorrhages in diabetic patients, with eventual loss of eye.

In intracapsular work all this may be attempted but with very much greater care, as the clot may adhere to the face of the vitreous and a thread of vitreous may come out with the clot. It is wiser in intracapsular work to be much more conservative and allow nature a longer time to clear the blood remnants, although the deposition of fibrin and pigment may interfere with the clarity of the vitreous face.

Hemorrhage into the posterior segment

A. Classical expulsive hemorrhage from the posterior segment. Nothing can be done for this, as a rule, except evisceration, relief of pain, and so forth. It is dealt with by expectant methods at first. It has occurred as late as on the eighth day after operation, in an apparently good eye.

B. Quiet hemorrhage into posterior segment. There may be lesser degrees of hemorrhage, and the first indication of a hemorrhage into the vitreous may be when the patient comes for testing; the vision is bad and there is no illumination. This type of hemorrhage is not necessarily associated with alteration in the depth of the chamber, nor is there any gaping of the wound. On the other hand it may be associated from the beginning with shallow chamber and tension, or this state may gradually set in.

Sudden hemorrhage

Spasmodic muscle action. I have observed, in the postoperative period, a hemorrhage fill the chamber whilst actually drops were being instilled. This presumably was due to a sudden starting movement on the part of the patient. To avoid such sudden movement: Open the unoperated-on eye first. Avoid light from the front. Warn the patient that a drop is coming at the time of first and subsequent dressings.

We have observed hemorrhage on one or two occasions in a perfectly quiet intracapsular case, shortly after the instillation of eserine. This must be a rare effect of eserine if indeed due to eserine at all.

The possibility does not prevent our using eserine ointment immediately after intracapsular operations, but we more frequently use pilocarpine, when a miotic is indicated, in the early dressings in the postoperative period, unless a more powerful action is desired for other reasons, such as threatened iris prolapse, when eserine is given twice daily.

After the first week dionine is helpful

in the absorption of hemorrhage from the chamber, but sneezing must be avoided.

Turned section. This complication, fortunately rare in ordinary clinics, may be seen where patients are unruly, nursing is inadequate, or overcrowding takes place. Interference by the patient, inadequate closing of the paretic lid, extreme irritability with entropion, or a lid adhesion to the lower bulbar conjunctiva are possible factors.

We see it from time to time. It is an ugly sight to open the dressing and observe the corneal flap projecting between the lids, or hinged completely over towards the lower fornix. The only thing to do is to prepare the eye and the patient as for a cataract operation—block the facial, give a retrobulbar, and so forth—and stitch the deep wound into position.

If there is insufficient conjunctival flap, a special corneal punch is helpful in getting needle bites in the absence of a corneal needle. It is surprising that a moderately good result may ensue. One would expect a total loss.

Adhesion of the Lid to the Section or to the Bulbar Conjunctiva Traumatized by the Forceps Grip

At the time of the first inspection it sometimes happens, especially in abnormal conditions of the conjunctiva, as, for instance, in trachoma, that an adhesion has taken place between the upper lid and the edge of the flap wound, or between the lower lid and the place where the forceps grip was taken. These adhesions are of no consequence, but one must be alive to their possibility in opening the eye, for it is somewhat puzzling if the condition is not recognized. The adhesion is merely broken down with the spatula and suitable ointments applied. Such an adhesion may determine a gape of the section.

Spasmodic Entropion or Ectropion

This may be a tiresome complication, inasmuch as the inturned lower lid is apt to cause pressure on the globe, and in any case gives rise to considerable uneasiness and fouling of the conjunctival sac. If strapping does not meet the occasion, an alcohol injection into the orbicularis, over the orbital rim near the outer canthus, a canthotomy, or a reef in the lid with sutures and beads may do so. Perhaps a linear radial cauterization is most effective.

Unmanageable Patients

Those who remove dressings and walk about without permission, running a risk of knocking the eye, must be treated with an effective dosage of sedatives, such as luminal or nembutal. Kirkpatrick's goggles are helpful, when strapped into position. Drops may be applied into the eye through the cross aperture.

Mania

When this develops in mental cases, or postoperatively in ordinary cases: Remove the bandages, give a good purge of blue pill and magnesium sulphate, employ effective sedatives, such as hyoscine, and apply the special goggles referred to above. If attendants are sufficient, hydrotherapy may prove useful.

For dealing with a case in emergency the straight waistcoat and sodium evipan are useful.

Conditions to be Avoided

Constipation—straining at stools must be anticipated; straining must be avoided. It is preferable to get the patient up and sitting on the stool, rather than using the bed pan. Straining is less under such circumstances, especially if a small oil or glycerine enema is given.

Piles may constitute an undesirable complication. This affection should be inquired into, and the bowels should be regulated accordingly, both in the preoperative and the postoperative period.

Careful nursing is important. Avoid straining or the coming down of piles. I once lost a case of strangulated piles from gas gangrene, largely because the patient was kept lying too long with the idea of getting a better eye. Flatulence in cardiac cases is best met by getting the patient sitting up from the start.

Cough has been considered. It is sometimes a cause of hemorrhage, or emptying of the anterior chamber. The cough should be treated by full doses of sedatives till the section is firm.

Urination. Difficulty in passing water is common in the first 12 hours. The patient may get a distended bladder. If ordinary methods fail, get the patient sitting up and squatting with a hot pack over the pubis. It is seldom necessary to pass a catheter except in cases of prostatic enlargements.

Sneezing. Certain habitual sneezers give warning of the condition and it is well to watch them perform before agreeing to undertake cataract extraction, as violent sneezing may completely ruin the operation in the first 3 or 4 days. If other measures fail and the sneezing is due to a local nasal condition, the plan of treating the patient by instilling cocaine and chloretone drops into both eyes together with atropine injections may help. I have in mind such a case. There was sinusitis which initiated violent sneezing in the early morning. It appeared to be controlled by such methods. Unfortunately the patient emptied the anterior chamber and had mild hyphema on the eighth day.

Care must be taken that sneezing is not produced by dionine in the first week; patients have been known to empty the chamber, and even cause incarceration, through sneezing after the administration of dionine, before the deep wound was firm. It must not be forgotten that there are individuals in whom a bright light thrown into the eye immediately produces a sneezing reflex. A light should be advanced cautiously from the side when examining the patient postoperatively.

Irritable conjunctiva and lids. Lacrimation and photophobia without obvious intraocular cause associated with itching, irritability and redness of lid margins may be seen especially in patients of eczematous habit.

In such cases leeches, hot compresses of sodium bicarbonate, instillations of weak nitrate of silver, weak pantocaine, and zinc-sulphate drops are useful.

Late emptying of anterior chamber, after the fifth day, is most often due to sudden strain, start, or trauma. This is an annoying complication, but as a rule not serious. The patient must be kept quiet again, atropine and dionine given, and the bandage reapplied.

Drug irritation of eczematous type; for example, that due to atropine or eserine. This is treated by change of drug, weak silver-nitrate drops, and packs of resorcin (0.25 percent), aluminium acetate dilute, or sodium bicarbonate. We get picric-acid irritation occasionally, since we dress with picric-oil lint.

Postoperative vomiting. Quite apart from morphia, vomiting may occur unexpectedly for unknown reasons. We have had eyes spoiled by attacks of vomiting which set in 6 or 8 hours after the operation, and, as far as we could tell, not due to the drugs used. In some of these cases it might be considered, perhaps, that a hemorrhage into the choroid had initiated the vomiting, which then made matters worse. To control vomiting, ordinary measures may be adopted; such as mustard plaster to the epigastrium, chloretone, sodium, bicarbonate, cocaine, iodine, ice, and so forth, internally.

Avoidance of postoperative discomfort. The position in bed ordinarily should be one of comfort. A rigid attitude with

regard to posture must be avoided. For crippled and arthritic patients, as also in cardiac and pulmonary cases, special arrangements must be made to insure suitable postures and good nursing. Surgical beds have the great advantage of providing for semirecumbent and sitting positions. But an easy chair at the bedside may be used with great comfort and benefit, sometimes the day after operation. Latitude of movement, however important, must be tempered with due warnings against abrupt, jerky, or jarring motions.

Control of the patient who will explore the eye and avoidance of injury during sleep are matters of good nursing, but wrist bandages to limit movement may often be valuable and even appreciated by the patient. Some of these things may seem trivial and hardly suited to a lecture to specialists; but they claim the attention sufficiently often in our practice to make our in-patient staff take notice and exercise themselves seriously in dealing with them. Presumably they may occur in your practice; when they do they must be considered.

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OCULAR LESIONS ASSOCIATED WITH POSTOPERATIVE AND GESTATIONAL NUTRITIONAL DEFICIENCY*

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The occurrence of hemeralopia and xerophthalmia among persons whose diet is deficient in vitamin A has been well established. Experimental data have confirmed the effect of deprivation of vitamin A on the production of these conditions. That deficiencies of other vitamins can cause lesions of the eye has not been so clearly demonstrated, although a number of clinical and a few experimental reports can be found in the literature. Cataracts have been observed among experimental animals that were receiving diets deficient in vitamin G (O'Brien,[1] Langston, Day, and Cosgrove[2]). Retrobulbar neuritis has been reported in association with beriberi by Fernando,[3] Shimazono,[4] and Katajama,[5] and in association with avitaminosis by Moore.[6] This association has led to the suggestion by Keefer[7] that the retrobulbar neuritis occurring among alcoholics and among women during lactation may be the result of a deficiency of vitamin B. Kepler[8] reported a case in which bilateral optic neuritis was associated with a beriberi that resulted from a diet of raw starch. Levine[9] reported a case in which acute optic neuritis was associated with pellagra that was secondary to chronic alcoholism. The neuritis cleared up as a result of a high-protein diet and additional vitamin B_2 (G); the use of alcohol was not discontinued. Levine quoted Quagliano,[10] Bietti,[11] and Krylov[12] as observing hemeralopia, cataracts, optic neuritis, and optic atrophy among pellagrins. It seems probable that in the average case, inadequate amounts of several rather than of single vitamins are concerned in the production of the deficiency syndrome. As stated by Benedict,[13] with reference to vitamin A, deficiency of vitamins in the organism may be produced by inadequate amounts in the diets, by deficient absorp-

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tion from the intestinal tract, or by increased consumption during rapid growth, or during a severe disease. In at least two of the postoperative cases presented in this report prolonged vomiting was apparently the basis for the nutritional deficiency.

Report of cases

Case 1. A boy, aged 14 years, was first seen at the clinic on September 13, 1935. Two years before he came to the clinic he had had a streptococcic infection of the right hip that had necessitated drainage. The postoperative course had been stormy; drainage from the hip had continued and chronic infection of the sinuses had developed. Toxemia had been present for a long time and the patient had lost 45 lbs. (20.4 kg.). About six months before his admission to the clinic, while he still was in the hospital undergoing surgical and orthopedic treatment, delirium developed; at the same time he suffered from almost complete loss of vision and peripheral neuritis in the legs. His ocular condition had been diagnosed as retrobulbar neuritis, which apparently was associated with encephalitis. When seen at the clinic, he complained of poor vision, particularly when the illumination was poor. His vision was 2/60 in the right eye and 6/30 in the left. Perimetry with a 3-mm. white test object revealed a complete annular scotoma with a radius of about 30 degrees. Ophthalmoscopic examination revealed a slight pallor of the optic discs with a definite generalized narrowing of the retinal arteries, the caliber of the arteries being about one third that of the veins. A high-vitamin diet was prescribed and the patient was given additional amounts of vitamins A and B and liver extract. In spite of the fact that the draining sinuses and a septic type of temperature persisted, examination on October 10, 1935, revealed some improvement in vision; that is, the vision of each eye was now 6/30. The preserved central fields were larger than they had been at the time of the previous examination, although the annular scotomas had broken through into the periphery in the upper nasal quadrants (fig. 1).

Comment. In this case, of course, it is impossible to affirm that the boy did not have an atypical retinitis pigmentosa. However, the acute onset of the loss of vision is evidence against this diagnosis, as is also the fact that there was no family history of night blindness. According to the father, who was a physician, the boy's vision had been entirely normal before the onset of the present illness. The acute onset of loss of vision, associated with an involvement of the central nervous system which left residual symptoms of the type seen in deficiency disease, suggests that the ocular lesion also was the result of a dietary deficiency. It is possible that the original retrobulbar neuritis, the mental symptoms, and peripheral neuritis were the result of a deficiency of vitamin B, while the residual ocular defect was dependent on a deficiency of vitamin A. We have not seen a report of the presence of definite annular scotomas in cases in which hemeralopia was caused by deficiency of vitamin A although such scotomas may have been observed. In the case reported by Wilbur and Eusterman,[14] hemeralopia was associated with a gastro-

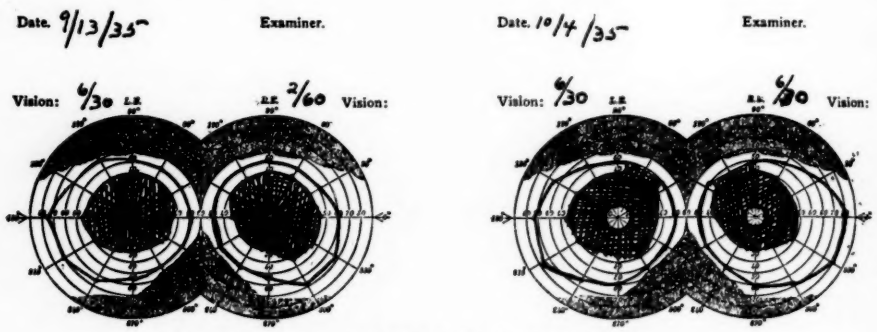

Fig. 1 (Wagener and Weir). Perimetric fields in case 1.

colic fistula, but no defects of the visual fields were demonstrable.

Case 2. A man, aged 47 years, was operated on in March, 1935, for chronic obstructing and bleeding duodenal ulcer. A posterior gastroenterostomy was performed and the appendix was removed secondarily. The patient convalesced normally until the seventh postoperative day, when gastric retention and vomiting developed. These persisted until the 43d postoperative day. During this period of retention a positive fluid balance was maintained by intravenous administration of dextrose and physiologic saline solutions. The urea content in the blood, the amount of chloride in the plasma, and the carbon-dioxide combining power of the plasma remained normal. However, the patient gradually lost 43 lbs. (19.5 kg.) in weight, and his general condition gradually became worse. On about the 38th postoperative day he began to complain of dizziness, blurring of vision, and impairment of hearing. These symptoms progressed and he became disoriented, confused, and slightly delirious. On the 43d postoperative day there was a slight rise in the temperature and an increase in the pulse rate. On the following day his temperature rose to 102° F., and his pulse rate was 170 beats a minute. He appeared to be very ill and at times was semiconscious. However, at this time the gastroenterostomy began to function. On the 43d day after the operation, examination of the eyes showed that he could count fingers at a distance of about 6 feet with each eye and that he could read large print with the left eye but not with the right eye. At the preoperative examination his vision and ocular fundi had been normal. Horizontal and vertical nystagmus was present. Ophthalmoscopic examination revealed bilateral acute optic neuritis with mild edema of the optic discs, which was greater in the right eye than in the left eye, and three large hemorrhages at the margins of the right optic disc. On the 45th postoperative day his vision was worse than it had been; the optic neuritis was more marked, hemorrhages were present in each retina, and nystagmus was more constant. Bilateral weakness of the external rectus muscles was present and there was evidence of diplopia. The neurologic findings suggested the possibility of an encephalitis. However, spinal puncture disclosed no abnormality of the cerebrospinal fluid. On the 48th day after the operation, intramuscular administration of liver extract and intravenous administration of ascorbic acid were begun. In addition, the caloric intake of food was gradually increased. On the fiftieth postoperative day the patient's vision had improved so that he could count fingers at a distance of 20 feet. The edema of the optic discs was less marked than it had been and no fresh retinal hemorrhages had appeared. On the 58th day after the operation the patient was able to read newspaper print readily and the edema of the optic discs had practically disappeared. A few residual hemorrhages were still seen in the right retina. Nystagmus and weakness of the external rectus muscles were still present and the patient was still occasionally disoriented. At the time of his dismissal from the hospital on the 79th postoperative day, his vision and ocular fundi were normal; he was well oriented, but still complained of some dizziness, diplopia, tinnitus, and impairment of hearing. He was instructed to take a high-caloric diet and additional vitamins in the form of yeast and viosterol. Some nystagmus and slight tremor were still present. Seven months later he reported an absence of gastric symptoms and a gain in weight of 37 lbs. (16.8 kg.). He still was experiencing some headache, dizziness, and diplopia. His memory for recent events apparently was impaired.

Comment. In this case the possibility of an infectious or toxic encephalitis has to be considered, but the absence of any definite source of toxemia, the short duration of the rise in temperature, the normal leukocyte count (8,200), and the normal spinal fluid are evidence against such a possibility. Christopher, Paskind, and Snorf[15] reported two cases in which multiple neuritis developed after operations on the biliary tract. The operations were followed by prolonged postoperative vomiting which lasted 41 days in the first case and 43 days in the second case. They expressed the opinion that some form of avitaminosis was responsible for the multiple neuritis. One of their patients manifested mental symptoms similar to those observed in our case 2. In support of their contention of the importance of avitaminosis in the production of these neurologic complications, these authors cited Wechsler's[16] report of eight cases in which multiple neuritis probably was the result of avitaminosis. In these cases the multiple neuritis occurred after prolonged vomiting, gastro-intestinal disturbances, or restriction in diet. The rather rapid improvement that followed spontaneous relief of the gastric retention and the parenteral injections of liver extract

and ascorbic acid in our case 2 suggests that the nutritional factor was a significant one in the production of the cerebral and ocular changes.

It is difficult to say whether the neurologic symptoms in such a case are the result of a general nutritional deficiency or are attributable to deprivation or overutilization of a specific vitamin. Experimentally, it has been shown that deficiencies of vitamin B have induced definite involvement of the nervous system. Pigeons in the terminal stage of vitamin-B deficiency manifest convulsive seizures, and a focal increase in the lactic acid in the lower parts of the brain has been demonstrated. Under similar conditions of deficiency of vitamin B dogs show focal degenerative changes in the cerebrum and pons. Katajama[5] has found degeneration in the medullary sheaths and axis-cylinders of the optic nerves in experimental deprivation of vitamin B. Eusterman and Wilbur[17] said that, until recently, vitamin B_1 and possibly vitamin B_2 were the only vitamins believed to play an important part in maintaining a healthy condition of the nervous system. The peripheral neuritis of beriberi and the involvement of the central nervous system in pellagra are well-recognized entities. Hess[18] reported a case of scurvy with focal degeneration of the lumbar segment of the spinal cord. In 1925 Stewart[19] reported the neurologic changes in 150 cases of scurvy seen during the war. Vitamin A probably plays a role in neutralizing the toxic effect of ergot and cereals (Mellanby[20]). From this it is evident that most of the vitamins are important in the maintenance of a healthy condition of the nervous system. In fact, Eusterman and Wilbur have declared that it is doubtful whether a deficiency disease of man, with the possible exception of scurvy, ever occurs without complications.

Case 3. A woman, aged 33 years, on February 8, 1936, underwent a pelvic operation for the relief of backache and difficult menstruation. As to the local operative wound, her convalescence was satisfactory. However, she was emotionally unstable, reacted unfavorably to her enforced rest in bed, and required a considerable amount of sedatives. On the eighth day after the operation vomiting began and continued for the next four or five days. On the 13th postoperative day she seemed somewhat irrational and complained of considerable loss of vision. She could see a light with either eye but was unable to distinguish moving objects. The pupils reacted normally to light, ocular rotations were performed normally, and ophthalmoscopic examination revealed normal ocular fundi. Because of the emotional instability and the large doses of sedatives she had taken, it was thought probable that her condition was either hysterical or associated with oversedation. The administration of sedatives was discontinued, and the patient was encouraged to get out of bed. However, by the 15th day after the operation the patient was definitely confused mentally, was questionably aphasic, and exhibited perseveration. Her sphincters were relaxed and her temperature had risen to 103° F. Her vision was reduced to questionable perception of light. The pupils were dilated and responded poorly to light; ocular rotations were limited in all directions, and there was a hemorrhage in the right retina above the macula. The value for the urea was 26 mg. per 100 c.c. of blood and that for the sugar was 120 mg. per 100 c.c. of blood. A blood culture was negative. Spinal puncture revealed no abnormality. On the suspicion that this might be a deficiency syndrome precipitated by the rather excessive vomiting by an unstable individual, administration of liver extract and yeast was begun on the 15th postoperative day. On the 17th day after the operation the patient was able to count fingers; on the 18th day, she could read large print, and on the 24th day, her mind was clear and she was able to be up and around. Her vision at this time was 6/10 in the right eye and 6/6 in the left eye; she could read fine print readily with either eye. Her visual fields were normal. The hemorrhage in the right retina had practically disappeared and no fresh hemorrhages had occurred.

Comment. While the period of vomiting in this case was rather short, the similarity of the clinical picture to that in case 2 and the rapid response to dietary therapy seem to justify our belief that the symptoms were the result of a nutritional disturbance, probably deficiency of vitamin B. Jolliffe, Colbert, and Joffe[21] have

confirmed the belief of Strauss[22] that peripheral polyneuritis of the alcohol addict is attributable to deficiency of vitamin B_1 and not to the toxic effect of alcohol. They reported that in four of their cases polyneuritis developed 15, 20, 22, and 33 days, respectively, after deficiency of vitamin B, and added that Ohomori had noted polyneuritis as early as the seventh to tenth day after deficiency of vitamin B. Apparently, in a susceptible subject, prolonged deprivation of vitamin B is not necessary for involvement of the nervous system.

That the optic neuritis and associated ocular and neurologic changes seen in these cases are in some way caused by the nutritional deficiency or deprivation of vitamin that result from persistent vomiting, and are not due to some vague toxemia or intercurrent infection, is further suggested by the occurrence of a very similar syndrome in cases of pernicious vomiting of pregnancy. Berkwitz and Lufkin[23] reported four cases in which toxic neuronitis was associated with pernicious vomiting of pregnancy. All the patients in these cases manifested mental confusion and optic neuritis; in three there were hemorrhages in the retina. Three of the four patients died in spite of spontaneous or therapeutic abortion. The characteristic pathologic lesions were found to be degenerative changes of the peripheral nerves and anterior-horn cells, and petechial hemorrhages in the brain and spinal cord.

Case 4. A woman, aged 23 years, was admitted to the hospital on February 22, 1932. She had been pregnant for two-and-a-half months and had been vomiting for about two months. She remained in the hospital for ten days and the vomiting was fairly well controlled. At home, however, the vomiting began again, almost at once, and she was readmitted to the hospital one week later. She was markedly dehydrated and somewhat depressed. In spite of intravenous administration of fluids to control the dehydration, her general condition became worse. On March 13th, she was mentally confused. An ophthalmoscopic examination on the next day revealed mild edema of the discs and of the peripapillary retinas, with dilatation of both arteries and veins, and several hemorrhagic areas in the retina. By the next day the edema of the optic discs had become more marked and the discs were ischemic in appearance. The patient now complained of marked loss of vision, which was the result of bilateral central scotomas. Because of the dehydration, the hemoglobin averaged 120 percent and the urea content was 162 mg. per 100 c.c. of blood; but these values returned to normal with the correction of the dehydration. There was evidence of hepatic damage in an icteric tinge of the skin and scleras and in the presence of bile in the urine. On March 15th, the pregnancy was terminated by a dilatation and curettage. Two days later, the patient's condition had become worse. She was delirious and exhibited paralysis of both external rectus muscles. Spinal puncture did not reveal any abnormality. On the following day, the patient died. Necropsy was not obtained.

Comment. In this case the neurologic diagnosis was encephalitis. The finding of a normal spinal fluid argued against an infectious origin of the encephalitis and optic neuritis, which had been considered to be toxic in type.

Case 5. A woman, aged 21 years, was admitted to the hospital on February 20, 1936, with the diagnosis of pernicious vomiting of pregnancy. She had begun to vomit about January 30th, and for four or five days had vomited all food. Then, the vomiting ceased for a week. Since that time, vomiting had been persistent and was not satisfactorily controlled during the nine days that she was in the hospital. She left the hospital on February 29th. The vomiting ceased on March 3d, only to start again on March 6th. At this time she began to complain of epistaxis, numbness of the face, blurring of vision, and diplopia. She was readmitted to the hospital on March 8th. On the following day she was found to have paralysis of both external-rectus muscles, marked convergent strabismus, and rather marked horizontal and vertical nystagmus. The results of neurologic examination were otherwise negative, except for the presence of subjective numbness in the face and lower extremities. Her mentality was somewhat clouded.

Ophthalmoscopic examination disclosed the presence of several rather large hemorrhages around each optic disc. Spinal puncture did not reveal any abnormality. The hemoglobin was 9.6 gm. per 100 c.c. of blood, and the erythrocytes numbered 3,630,000 per c.mm. of blood. Increased capillary fragility was demonstrated.

A diagnosis of toxic neuronitis was made. The patient's general condition was considered as not sufficiently good to permit of surgical interruption of the pregnancy. Consequently, liver extract was administered intramuscularly, a preparation of vitamin C (Cebione) was injected intravenously, and a concentrate of vitamin B and brewer's yeast was given by mouth. The patient's general and mental condition improved definitely. One week after this therapy had been instituted, the hemorrhages in the retina had become almost completely absorbed. Abdominal hysterectomy was performed on March 21st, 13 days after her second admission to the hospital, and when the patient left the hospital about three weeks after the operation she was in fair condition, although the paralysis of the external-rectus muscles and the nystagmus were still present to some extent. Ophthalmoscopic examination at this time revealed normal ocular fundi. On May 18th, about one month after her dismissal from the hospital, the patient had normal vision and normal ocular fundi, and the ocular muscles were normal except for the presence of a slight residual convergent strabismus of the left eye.

Comment. It has been the general tendency to consider the cause of these neurologic and ocular complications of pernicious vomiting of pregnancy to lie in some toxin generated by the pregnancy. Berkwitz and Lufkin favored this theory of "autointoxication" although they admitted that "the clinical and pathologic picture of the nerve changes in pregnancy is the same as that resulting from alcoholism, infectious conditions, and diet-deficiency disturbances such as beriberi and pellagra." Stander[24] reported two cases of pernicious vomiting of pregnancy with hemorrhages in the retina. He expressed the opinion that the hemorrhages are the result of a toxic injury to the capillary walls with increased permeability, although in speaking of the hepatic damage found at necropsy in one case he did say that "it is conceivable that starvation, rather than the vomiting of pregnancy, may be the underlying cause of these hepatic lesions." One patient died in spite of therapeutic abortion. The second patient recovered after immediate termination of the pregnancy, but hemorrhages were still present in the retina at the time of her dismissal from the hospital three weeks after the induced abortion. On the other hand, Winans and Perry[25] asserted that the polyneuritis associated with vomiting of pregnancy is a deficiency disease. They recommend that liver extract be given intramuscularly daily from the beginning, since this provides a simple method of administration of the vitamin B complex. They stated that, "the response to intramuscular liver extract in many cases is as gratifying as that seen in deficiency anemias." The occurrence of an identical syndrome in one of their cases in which the patient merely thought that she was pregnant caused these authors to suggest that "there is no special toxemia responsible for these symptoms."

General comment

This view would seem to be supported further by the occurrence of an essentially similar syndrome in the cases of postoperative vomiting reported in this paper. The fact that administration of vitamins caused the absorption of hemorrhages in the retina in our second case of pernicious vomiting of pregnancy before the interruption of the pregnancy, whereas the hemorrhages in Stander's case were still present three weeks after the induced abortion, also suggests the influence of nutritional deficiency in the causation of the retinal hemorrhages. It is of interest to note that in the cases of polyneuritis associated with vomiting of pregnancy reported by Winans and Perry, all of the patients recovered as a result of vitamin therapy, whereas in three of the four cases reported by Berkwitz and Lufkin the patients died in spite of therapeutic or spontaneous abortion.

Summary

It seems probable that acute optic neu-

ritis, hemorrhages in the retina, paralyses of ocular muscles, and nystagmus may be caused by dietary or nutritional deficiencies. These deficiencies may develop rather rapidly, especially in the presence of persistent vomiting and the resultant lack of absorption of food.

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THE GRADIENT OF RETINAL ILLUMINATION AND ITS PRACTICAL SIGNIFICANCE

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The answer to the problem of why uncorrected ametropia causes relatively low visual acuity is not so obvious as it may at first appear. The concept of gradient of retinal illumination, here brought forward, affords an adequate explanation for this problem as well as for several other allied problems. An analysis of the "More Light—Better Sight" test indicates that the apparent discrepancy between the results of this test and those of the classical experiments appears to be mainly due to the fact that the former test is either designed to, or happens to, provide an almost minimal gradient of retinal illumination per unit of intensity thrown on the reading material.
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An uncorrected ametropic person has relatively low visual acuity and his visual acuity increases when the proper correcting lens is placed at the proper distance before the eye. The author has inquired of several ophthalmologists what the explanations of these facts are and has received no satisfactory response. The situation seems to be that the facts are so obvious that any difficulty in their explanation is commonly overlooked.

Ametropia may be defined as a condition in which all parts of the image of a distant object are not conjugate with points on the retina when the accommodation is relaxed. This means that if a clear image is formed in ametropia, it is formed, say, in the vitreous, if we are dealing with stigmatic myopia. But light from the object does get to the retina in such a case. Then why is the acuity low? The natural response is, "Because the retinal image is blurred." But this response is inadequate. A blurred image of the letter A is certainly different from a blurred image of the letter B if the eye has any image-forming qualities whatsoever. Now why can not the myopic person distinguish a blurred A from a blurred B? To be sure, individuals can acquire the ability to interpret letters which are somewhat blurred, and this probably explains the occasional increase of visual acuity of some ametropic persons after the correcting lenses have not been worn for some time, and the results of certain unorthodox methods of treatment. This ability to interpret blurred images is, however, clearly limited, so we return to the question: Why can not the myopic person distinguish a blurred A from a blurred B? The response to this might be that a blurred A is more like a blurred B than a clear A is like a clear B. This answer would be adequate if we could define what we meant by "more like." Now we can not give this definition in terms of whether we can visually distinguish the two or not. Thus we can not say that a blurred A is more like a blurred B than a clear A is like a clear B because at 20 feet the blurred A cannot be distinguished from the blurred B while the clear A can be distinguished from the clear B, for this is simply saying that a blurred A is blurred in appearance and hence difficult to distinguish from a blurred B, and the question still remains, "What makes a blurred A difficult to distinguish?"

Now, in general, an increase in contrast results in higher acuity, as has been shown by Cobb,[1] Hulshoff,[2] Roelofs and de Haan,[3] Petren and Johansson,[4] using figures of different intensities on backgrounds of different intensities. Roelofs and de Haan came to the conclusion that $S = K \sqrt{\pm (O—G)}$, where S is the

visual acuity; O, the intensity of the object or figure; G, the intensity of the ground and K, a constant of proportionality. The equation states that the visual acuity is proportional to the square root of the difference of intensity between the figure and the ground. This law, of course, does not hold with exactitude for all intensity levels, but in general it seems clear that the greater the contrast the higher the acuity. For the purpose of sharply delineated printed figures it may be sufficient to define contrast as the difference of intensity between the figure and the ground. But in dealing with the image of the ametropic or, indeed, the emmetropic eye we must recognize that the retinal image is not sharply bounded and hence a more general definition of contrast will be necessary. Here we are interested in how rapidly the illumination changes as we move along the retina; the abruptness of the change of illumination. Let us then, as a first approximation, define contrast as the rate of change of illumination with respect to distance on the retina. Thus, suppose we examine two adjacent points, C and D, on the retina which are separated by 0.01 mm. Now if we find that the illumination at C is 100 times as great as it is at D, then the rate of change of illumination with respect to distance on the retina may be considered high. If, however, point C is only twice as bright as point D, then we have a low rate of change of illumination with respect to distance on the retina. In the first instance we would say that the contrast was high; in the second instance we would say that the contrast was low.

Let us apply this to the reading of the letter A. The letter on the chart has a high contrast value. The black of the letter stops quite abruptly and the white of the chart begins. If we were to suppose that the eye regarding this letter were an optical instrument perfect in its image-forming characteristics and lacking any aberration or diffraction, then we should find that a point on the retina received rays of light from one and only one point on the chart, and so for every other point on the retina. Then the retinal image would also have a high contrast value. But suppose that the retinal image is that of an eye suffering from ametropia as defined, but otherwise perfect. Then any point on the retina receives rays from several points on the chart, instead of from one point only. Suppose, for the sake of simplicity, we call the rays from the black portion of the chart black rays. Since the reflection factor of the print is not zero, some rays are indeed reflected by the print and these we call black rays, the true situation being that the density or number of light rays is small. Now if we consider a portion of the retina which in a perfect eye would be conjugate with a black portion of the letter, we find that in the ametropic eye there are at this point not all black rays but instead there is a mixture of black and white rays which results in an intermediate intensity depending upon the proportion of black and white rays. Similarly a portion of the retina, which in a perfect eye would be conjugate with a white portion of the chart, receives in the ametropic eye a mixture of black and white rays which results in a gray. Of course, the portion of the retina which should correspond to the black point is a darker gray than that portion of the retina which should correspond to the white point, but the difference of intensity between the two points will not be so great as it is in the perfect eye.

Suppose we assume an ideal situation in which we designate the background of the chart as having an intensity of 100 units while the letter or figure on the chart has an intensity of zero units. Con-

sider the retina of the perfect eye: As we move along the portion that corresponds to the background we get, let us say, 100 units of illumination; but the moment we enter that portion of the retina which corresponds to the figure, the illumination at once drops to zero. The rate of change of illumination with respect to distance on the retina is great and the contrast value is high. Now consider the retina of the ametropic eye. Let us start out well to the periphery and assume that the eye is fixating the letter. At the periphery the illumination may not be far from 100, since, unless the eye is extremely defective as an image-former, not many of the black rays from the figure will travel so far out of their perfect paths as to arrive at this point in the periphery. But as we approach the central portion of the retina, the illumination decreases as more and more black rays fall on points which should be occupied wholly by white rays. Then when we examine that portion of the retina which should correspond to the figure, we find that white rays are falling on it in addition to the black; so that although the illumination is low, it is not so low as it is in the perfect eye. Thus we see that in the uncorrected ametropic eye the rate of change of illumination with respect to distance on the retina is relatively small and the contrast value is relatively low.

Now when we say rate of change of illumination with respect to retinal distance, we use a perfectly good mathematical concept which, if we let I equal illumination and s equal retinal distance, may be formulated as dI/ds, which is called the derivative of I with respect to s. But we have not specified in which direction we are to proceed along the retina. Starting at any point, P, on the retina we might find an indefinitely large number of values for dI/ds, depending upon the direction in which we started out from P. Let us consider the letter I on a chart and, more particularly, the point P on the right hand boundary of the figure.

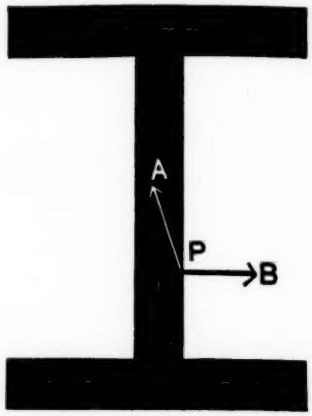

Fig. 1 (Ludvigh). Diagram illustrating the factor of direction in the gradient of retinal illumination.

Suppose we travel from P towards A. As we do so the illumination I does not change, that is, $dI/ds = 0$, if we measure s in the direction P to A. Now if the figure were an image on the retina of the perfect eye, the situation would be the same as it is in the figure. It is not, then, a criterion of a good eye that the rate of change of illumination with respect to distance on the retina is high in every direction, which could be brought about merely by increasing the intensity, or that it is high in an unspecified direction, which could be brought about by the application of a cylinder at the necessary axis, but rather that it is high in the direction in which it is high in the figure. Now in the usual clear-cut figures we may note that the change in intensity per unit distance is ordinarily greatest if we travel along a line that is perpendicular or normal to the edge of the figure at the point at which we started. In the diagram this is the direction P to B for the point P. But the line PB is then normal to the edge of the figure at the point P. If we take dI/ds when s is taken along the direction P to B, it is clear that the

change in intensity is rapid and therefore dI/ds is great. In mathematics there is a concept that corresponds to what we have been discussing. It is the notion of a directional derivative. We have seen that we could take the derivative of I with respect to s in any number of directions. But for our purposes it is a particular direction which defines contrast between the figure and its ground, and that is the direction perpendicular or normal to the edge of the figure. Now in mathematics the derivative of a function in the direction of the normal is called the gradient and is symbolized by df/dn. In our particular case the function is one relating illumination, I, to distance on the retina, s, when this distance is measured along the normal to the edge at the point in question. Thus in our figure, contrast at P is given by dI/ds when s is taken in the direction P to B. If we consider the same situation with respect to the retinal image, it is clear that we are speaking of the gradient of retinal illumination. And it is the gradient of retinal illumination that is contrast.

It is apparent that, when observing the same figure, the gradient of retinal illumination of an ametropic eye will be less than that of an emmetropic eye, and further, that the more marked the ametropia, the less the gradient of retinal illumination. We can now give a specific answer to the first question originally proposed, "What is the cause of the reduced acuity in an uncorrected ametropia?" Answer, "The lower gradient of retinal illumination in ametropia." We may also answer the second question, "Why does the visual acuity of an ametropic person increase when the proper correcting lens is placed in the proper position before the eye?" Answer, "Because the correcting lens increases the gradient of retinal illumination."

We may further note that visual acuity is probably more intimately related to the ratio of the gradient of retinal illumination to absolute retinal illumination than it is to the gradient of absolute retinal illumination. If, therefore, we express the gradient of retinal illumination as a fraction of the absolute retinal illumination, we have a concept which gives an immediate qualitative explanation of the loss of acuity with "veiling" and "dazzling" glare,[5] and is thus of considerable practical value.

It must be emphasized that visual acuity is dependent upon many other factors than gradient of retinal illumination. Among these factors are adaptation, fixation tremor, optical aberrations, spatial induction, and so forth. In fact, the gradient of retinal illumination may be relatively ineffective due to inadequate adaptation. If we consider the states of excitation of the various retinal elements, we may speak of a gradient of excitation. At the level of the optic nerve and in the occipital lobes we may speak of a gradient of frequency of nerve impulse. To exclude these other factors is to make use of a simplified system which omits some of the facts, but which is justified if it results in clearer thought and is of practical value.

Let us now apply the notion of gradient of retinal illumination to another practical problem. As such a problem it is timely to select one which arises in the commercially sponsored "More Light—Better Sight" campaign which is well known at the moment. The contention is that intensities of illumination much higher than those at present commonly employed are necessary for "good seeing." Since the demonstration has to do with visual acuity, we shall not here discuss the possible effects of intensity of illumination on heart rate, fatigue of convergence, and so forth.

The mode of demonstration as presented to the author and other members of the laboratory staff may be described

briefly as follows: The demonstrator presents a chart upon which is printed material in letters of uniform black. The paper that constitutes the background is bright white at the top of the page and shades off, becoming more and more gray, until at the bottom of the page it is nearly black. This chart is placed on the arm of a chair in which the subject is seated. The demonstrator is equipped with an illuminating device which permits him to throw upon the chart a wide range of intensities. The demonstrator rapidly turns up the intensity until it is quite high and challenges the observer to start reading the bottom lines. The observer is unable to comply. The demonstrator now rapidly cuts down the intensity of illumination and again challenges the observer to read. The latter is again unable to comply. The demonstrator now gradually increases the intensity until the observer can read some of the lines in the middle of the page. A further gradual increase of intensity permits even the bottommost line to be read. A "light-meter," ordinarily a sandwich type of photovoltaic cell, is now placed on the page with its face toward the light source. The intensity of illumination recorded is shown to be surprisingly high, anywhere from 20 foot-candles up.

The test is said to prove that: 1. Over a wide range of possible intensities there is a critical small range in which acuity is at its optimum. 2. The maximum acuity occurs at a high intensity. 3. The range of intensities which produce an observable change in the acuity is large.

Now these conclusions all appear to be in conflict with the data of König's experiments[6] published in 1897 which have been consistently confirmed by later experimenters. Those experiments indicate that a change of intensity of over 10,000,000 to 1 results in a change of acuity of only approximately 20 to 1. They further indicate that practically no increase of acuity results from raising the intensity above 16 foot-candles.

Let us analyze the "More Light" test further. At first the intensity of illumination is changed rapidly; this gives the retina little time to adapt and results in a momentary low acuity so that the print cannot be read at once. Before adaptation has taken place sufficiently to permit reading, the demonstrator gradually increases the intensity of the illumination. This gradual change is followed by adaptation, and the observer is thus enabled to read the middle lines. The observer is, nevertheless, still severely handicapped. The bright portion at the top of the page and above the lines which he is reading also illuminates the retina and causes a certain amount of irradiation. The light from this upper portion of the field also prevents adaptation from occurring to the degree which is optimum for the middle portion of the page. Another function of the bright upper portion of the page is that of preventing an adequate dilation of the pupil which would increase the effective intensity of the retinal images from the middle portion of the page. Operating under these unusual handicaps the acuity is, naturally, rather low. The intensity of illumination must then be increased still further to permit the reading of the bottom lines. Let us say that at an intensity of illumination of 40 foot-candles the bottom line can be read. Now although the intensity of illumination is high, our acuity depends, as we have seen, more immediately upon the gradient of retinal illumination. If for the bottom line the reflection factor of the print is roughly 10 percent and that of the background 20 percent, then the apparent brightness of the print will correspond to 4 foot-candles and that of the

background to 8 foot-candles, a difference of 4 foot-candles rather than 40. Furthermore, the gradient of retinal illumination will be even less than would ordinarily correspond to this external brightness because of irradiation and inadequate pupillary dilation. The gradient of excitation, at the level of the retinal elements, will be relatively still lower because of inadequate adaptation.

The results of the test are qualitatively consistent with the view that the test involves the lower values of the function relating visual acuity to photons. The apparent discrepancy between the results of the "More Light—Better Sight" tests and those of the classical experiments thus appears to be mainly due to the fact that the former test is either designed to, or happens to, provide an almost minimal gradient of retinal excitation per unit of intensity thrown on the book. These are conditions to which the eye is never subjected in ordinary reading.

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SURGICAL RESULTS IN 223 CASES OF HETEROTROPIA*

Especial reference to orthoptic training

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There is a growing tendency among ophthalmologists to consider the results of the surgical treatment of strabismus unsatisfactory unless satisfactory binocular vision is obtained.[1, 2, 3, 4, 5, 6, 7] Because my experience has demonstrated that orthoptic training, in the broad sense implied by the British Orthoptic Council rather than in the limited sense implied by Hicks and Hosford,[8] is an important adjunct to the surgical treatment of strabismus, the results obtained both with and without orthoptic treatment are presented.

Results effected by the combined orthoptic and surgical treatment of strabismus seem to justify the conclusion that methods of orthoptic training and the knowledge concerning the application of these methods have improved. When orthoptic training no longer decreases the deviation of the ocular muscles, operation usually should not be postponed. Following operation, orthoptic training should be begun as soon as possible. The training methods and procedures are substantially the same as those previously described.[4]

Important factors to be considered in the surgical treatment of strabismus are:

(a) Correct refractive errors early. Physicians must be taught that patients with squint should be referred immediately to an ophthalmologist.

(b) Overcome amblyopia early. Peter's experience,[1] as well as mine, demonstrates the importance of this because the development of normal binocular vision usually becomes more difficult as the patient's age increases.**

(c) Prevent suppression or the development of fixed abnormal retinal correspondence by early and continuous optic and orthoptic treatment.

(d) Begin the training of binocular vision as early as possible and continue it until there is a wide amplitude of fusion at 6 meters and 25 cm. as tested with prisms and, if possible, without correcting lenses. Be certain that the patient fuses for near on 300-mm. print, if possible, without prisms or correcting lenses. Also attempt to develop accurate stereopsis. The importance of preoperative and postoperative orthoptic training has been previously pointed out.[4] The value of using one of the amblyoscope group of instruments (synoptophore, orthoptoscope, synoptiscope), if the deviation is greater than 20 degrees, should be kept in mind; one of these instruments may be useful even if the deviation is less than 20 degrees, if abnormal retinal correspondence exists.

(e) Continue to study aniseikonia and endeavor to determine whether the condition is a factor in preventing fusion, especially in those cases in which the images are easily approximated but no fusion can be developed.

(f) Operate early if orthoptic training is not producing the desired results. I pre-

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** The study of amblyopia presented in this paper does not seem to bear out my impression and Peter's experience[1] that amblyopia is overcome more completely in young people; however, 85 case reports are too small a number on which to base conclusions.

fer to operate on children between the ages of three and four years because, at that time, the deviation can usually be measured with the screen test and prisms; the degree of binocular vision can be determined fairly accurately; lenses and orthoptic training have probably accomplished their primary purpose; and, finally, the patients are old enough to coöperate with the ophthalmologist in postoperative orthoptic training. At this age be careful not to weaken any one muscle so much that secondary inward or outward deviation may occur. Especial care should be exerted if amblyopia is marked, if hypertropia, especially if bilateral hypertropia, is a factor, and when second-grade binocular vision cannot be developed.

(g) When the deviation becomes fixed and fails to improve in spite of all methods of treatment employed, operate at intervals until the eyes are in such a position that the patient's fusion faculty is not too greatly taxed.

SELECTION OF SURGICAL TECHNIQUE AND THE MUSCLE TO BE OPERATED UPON

Because of the numerous variations of technique in the surgical treatment of strabismus, I believe that the selection of the technique is relatively unimportant, provided the surgeon has had adequate experience with the procedure he employs and that the field of action of an individual muscle is not limited except in definite paralysis or paresis of one muscle, when the action of the spasmodic associated muscle usually should be decreased. My preference is for recession[9, 10, 11] or retroplacement,[12, 13, 14] if this type of operation is not contraindicated, because the action of the overacting muscle is decreased and no muscle tissue is permanently destroyed as in resection and tucking.

In high degrees of esotropia with normal relative or absolute near point of convergence and no limitation of adduction, I usually perform bilateral retroplacement of the medial recti followed, if correction is incomplete, after a period of orthoptic training, by resection[15] of one or both of the lateral recti. In patients with high degrees of divergent strabismus due to divergence excess, bilateral retroplacement of the lateral recti is usually performed first, followed by a period of exercises to stimulate convergence. If the desired result is not obtained, resection of one or both of the medial recti is performed.

Whenever feasible, it is more satisfactory to strengthen rather than to weaken a depressor. In paralysis of the superior rectus, as previously stated,[4] when the error is low (less than 4 prism diopters by the screen and parallax test), I advise lengthening or intracapsular resection[16] of the inferior oblique of the opposite eye. If the error is high (from 4 to 10 prism diopters), myotomy of the inferior oblique may be performed. If the error is greater than 10 prism diopters, myectomy of the inferior oblique is advisable and may have to be followed by resection of the superior rectus.

If the inferior rectus is paralyzed, resection of the paralyzed muscle is to be preferred, although guarded retroplacement or lengthening of the superior oblique[17] of the other eye may also be required. It is well to remember that the inferior rectus and inferior oblique muscles are joined by bands of connective tissue and that surgical intervention on either of these muscles may disturb the function of the other muscle.

Should the superior oblique be affected, tenotomy or lengthening of the inferior oblique of the same eye or retroplacement of the opposite inferior rectus is advisable, or the superior oblique may be advanced.[17]

In paralysis of the inferior oblique, retroplacement of the superior rectus of the opposite eye may be performed; possibly, this procedure may be combined with advancement of the inferior oblique.

In low degrees of vertical deviation, the O'Connor cinch operation[18] appeals to me as the operation of choice, but I have had no experience with this technique. However, I have overcorrected patients by retroplacement of one of the elevators.

Since excellent results may be obtained by various means, the selection of the muscle to be operated upon and the type of operation to be performed should depend upon the experience and judgment of the surgeon, based upon preoperative and operative findings.

RESULTS OF SURGICAL AND ORTHOPTIC TREATMENT OF ESOTROPIA AND EXOTROPIA

Two hundred and twenty-three patients* were operated upon for strabismus. These patients were classified as follows: (I) patients who were operated upon and received no orthoptic training; (II) patients who received orthoptic training following operation; and (III) patients who received orthoptic training both before and after operation.

The results were tabulated according to Worth's classification of binocular vision as follows: (a) first grade (superimposition), (b) second grade (fusion) and (c) third grade (stereopsis). The cases were classified also in regard to whether heterophoria was developed or whether heterotropia persisted. In order to determine the grade of binocular vision the patient was examined by means of special slides placed in the orthoptoscope or a similar instrument. Stereopsis in heterophoria should be checked with a 6-meter stereoscope,[19] preferably a recording model.[20]

Group I. In the first group (table 1), 49 patients with heterotropia were operated upon and received no orthoptic training. There was no preoperative record of the grade of binocular vision in 48 of these patients; one patient suppressed the vision in one eye. Following operation heterotropia persisted in 46 patients (94 percent), while three patients (6 percent) developed heterophoria and second-grade binocular vision.

TABLE 1

GROUP I. SURGERY ONLY

RESULTS OF THE SURGICAL TREATMENT OF 49 PATIENTS WITH HETEROTROPIA

	Preoperative Findings Number of Patients
Suppression	1
No record of binocular vision	48
Total	49
	Postoperative Findings Number of Patients
Heterphoria and Second-grade binocular vision	3
Heterotropia	46
Total	49

Hicks and Hosford[8] obtained the following striking results in 24 patients who were operated upon and received no orthoptic training, that is, in the limited sense of fusion training used by the authors: third-grade fusion in 8, second-grade fusion in 8, first-grade fusion in 2, and no fusion in 6. Of 36 patients, also reported by Hicks and Hosford, 24 with convergent strabismus, 8 with divergent strabismus, and 4 with external deviation, following tenotomy of a medial-rectus

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TABLE 2

GROUP II. SURGERY FOLLOWED BY ORTHOPTIC TRAINING

GRADE OF BINOCULAR VISION IN 70 PATIENTS WITH ESOTROPIA

	Before Treatment Number of Patients	After Treatment Number of Patients
Third-grade binocular vision	3	21
Second-grade binocular vision	7	15
First-grade binocular vision	6	6
Abnormal retinal correspondence	11	13
Alternation of fixation	7	1
Diplopia	1	2
Suppression of one image	12	3
No record	23	9
Total	70	70

GRADE OF BINOCULAR VISION IN 15 PATIENTS WITH EXOTROPIA

	Before Treatment Number of Patients	After Treatment Number of Patients
Third-grade binocular vision	0	8
Second-grade binocular vision	3	1
First-grade binocular vision	2	1
Abnormal retinal correspondence	4	1
Alternation of fixation	2	1
Diplopia	1	1
No record	3	2
Total	15	15

muscle, third-grade fusion was present in 19, second-grade fusion in 6, first-grade fusion in 6, and no fusion in 5.

Group II. Group II (operation followed by orthoptic training, table 2) includes 85 patients, of whom 70 had esotropia (43 monocular and 27 alternating), while 15 had exotropia (9 monocular and 6 alternating). Prior to treatment, third-grade binocular vision was present in only three patients (3 percent); second-grade binocular vision in 10 patients (12 percent); and first-grade binocular vision in eight patients (9 percent). Suppression, alternation, diplopia, and abnormal retinal correspondence, respectively, were present in 38 patients (45 percent), while there was no record of the grade of binocular vision in 26 patients (31 percent). Following surgical and postoperative orthoptic treatment (table 3), third-grade binocular vision was present in 29 patients (34 percent); second-grade binocular vision in 16 (19 percent); and

TABLE 3

SUMMARY OF TABLE 2

GROUP II. RESULTS OF THE COMBINED SURGICAL AND POSTOPERATIVE ORTHOPTIC TREATMENT OF 85 PATIENTS WITH HETEROTROPIA

Third-grade binocular vision	29 patients (34 percent)	52 patients (61 percent)
Second-grade binocular vision	16 patients (19 percent)	
First-grade binocular vision	7 patients (8 percent)	
No single binocular vision	22 patients (26 percent)	
No record	11 patients (13 percent)	
Total	85 patients (100 percent)	

first-grade binocular vision in seven patients (8 percent). Diplopia, suppression, abnormal retinal correspondence, and alternation, respectively, were present in 22 patients (26 percent) and there was no record of the grade of binocular vision in 11 patients (13 percent).

Following surgery and postoperative orthoptic training, heterophoria was present in 27 patients (32 percent); heterophoria for distance and heterotropia for near in three patients (4 percent); heterophoria for near and heterotropia for distance in two patients (2 percent); heterotropia persisted in 47 (55 percent) and there was no record of whether heterophoria or heterotropia was present in six patients (7 percent).

It is interesting to note that Lordan,[21] who employed orthoptic training after surgery in the treatment of 60 cases of strabismus, obtained third-grade fusion in 24 (40 percent); second-grade fusion in 10 (17 percent), and first-grade fusion in six (10 percent). No degree of fusion was obtained in two (3 percent), and fusion was not determined in 18 (30 percent). These findings agree with my results when orthoptic training was prescribed postoperatively.

Group III. Group III (orthoptic training before and after operation, table 4) includes 89 patients. Of this group, there were 74 patients with esotropia (44 monocular and 30 alternating), and 15 patients with exotropia (13 monocular and two alternating). Prior to treatment, third-grade binocular vision existed in six patients (7 percent); second-grade binocular vision in 25 patients (28 percent); and first-grade binocular vision in seven patients (8 percent). Suppression, diplopia, alternation, and abnormal retinal correspondence, respectively, were

TABLE 4

GROUP III. ORTHOPTIC TRAINING BEFORE AND AFTER SURGERY

GRADE OF BINOCULAR VISION IN 74 PATIENTS WITH ESOTROPIA

	Before Treatment Number of Patients	After Treatment Number of Patients
Third-grade binocular vision	6	28
Second-grade binocular vision	20	24
First-grade binocular vision	5	2
Abnormal retinal correspondence	11	7
Alternation of fixation	6	2
Diplopia	3	3
Suppression of one image	2	1
No record	21	7
Total	74	74

GRADE OF BINOCULAR VISION IN 15 PATIENTS WITH EXOTROPIA

	Before Treatment Number of Patients	After Treatment Number of Patients
Third-grade binocular vision	0	8
Second-grade binocular vision	5	2
First-grade binocular vision	2	1
Abnormal retinal correspondence	3	1
Diplopia	1	1
Suppression of one image	2	0
No record	2	2
Total	15	15

TABLE 5

SUMMARY OF TABLE 4

GROUP III. RESULTS OF THE COMBINED SURGICAL AND PREOPERATIVE AND POSTOPERATIVE ORTHOPTIC TREATMENT OF 89 PATIENTS WITH HETEROTROPIA

Third-grade binocular vision	36 patients (41 percent)	65 patients (73 percent)
Second-grade binocular vision	26 patients (29 percent)	
First-grade binocular vision	3 patients (3percent)	
No single binocular vision	15 patients (17 percent)	
No record	9 patients (10 percent)	
Total	89 patients (100 percent)	

present in 28 patients (31 percent). There was no record of the grade of binocular vision in 23 patients (26 percent). Following preoperative and postoperative orthoptic training (table 5), third-grade binocular vision was present in 36 of these patients (41 percent); second-grade binocular vision in 26 patients (29 percent); and first-grade binocular vision in three patients (3 percent). Abnormal retinal correspondence, suppression, diplopia, and alternation, respectively, were present in 15 patients (17 percent). The grade of binocular vision was not recorded in nine patients (10 percent).

Following surgery and preoperative and postoperative orthoptic training, heterophoria was present in 43 patients (49 percent); heterophoria for distance and heterotropia for near in three patients (3 percent); heterophoria for near and heterotropia for distance in three patients (3 percent); heterotropia persisted in 37 patients (42 percent), and there was no record of whether heterophoria or heterotropia was present in three patients (3 percent).

TABLE 6

RESULTS OF THE SURGICAL AND ORTHOPTIC TREATMENT OF 67 PATIENTS WITH ALTERNATING SQUINT

GRADE OF BINOCULAR VISION IN 59 PATIENTS WITH ESOTROPIA

Orthoptoscope Findings	Before Treatment	After Treatment
Third-grade binocular vision	5	23
Second-grade binocular vision	10	16
First-grade binocular vision	4	2
Abnormal retinal correspondence	4	5
Alternate suppression	13	3
Diplopia	2	2
No record	21	8
Total	59	59

GRADE OF BINOCULAR VISION IN 8 PATIENTS WITH EXOTROPIA

Orthoptoscope Findings	Before Treatment	After Treatment
Third-grade binocular vision	0	4
Second-grade binocular vision	2	2
Abnormal retinal correspondence	0	1
Alternate suppression	3	0
Diplopia	1	1
No record	2	0
Total	8	8

ALTERNATING SQUINT

Included in Groups I, II, and III were 67 patients with alternating squint. In order to study them as a separate group, the findings have been recorded in table 6. A diagnosis of alternating strabismus is made, if the patient's visual acuity is the same in the right and left eyes, and if he fixates alternately with either eye, showing no preference for either eye, that is, if he alternates fixation both voluntarily and with the screen test.

There were 59 patients with esotropia and eight with exotropia. Prior to treatment, examination on the orthoptoscope revealed that five patients with esotropia had third-grade binocular vision; 10 had second-grade binocular vision, and four first-grade binocular vision. Abnormal retinal correspondence, diplopia, and suppression, respectively, were present in 19 patients. In 21 patients, the grade of binocular vision was not recorded. Following treatment, 23 patients had third-grade binocular vision; 16 had second-grade binocular vision, and two first-grade binocular vision. Ten patients had abnormal retinal correspondence, alternation, diplopia, or suppression. There was no record of binocular vision in eight.

Of the eight patients with exotropia, prior to treatment, examination on the orthoptoscope revealed that second-grade binocular vision was present in two patients; one had diplopia, and three had alternate suppression. No record of the grade of binocular vision had been made in two patients. Following treatment, four had third-grade binocular vision, two second-grade binocular vision, one had abnormal retinal correspondence, and another diplopia.

Of the 67 patients with alternating esotropia or exotropia, following orthoptic and surgical treatment, 27 (40 percent) had third-grade binocular vision; 18 (27 percent) had second-grade binocular vision; and two (3 percent) had first-grade binocular vision. Twelve (18 percent) had no single binocular vision and in eight (12 percent) the grade of binocular vision was not recorded. Therefore, 47 patients (70 percent) with alternating esotropia or exotropia developed some degree of binocular vision.

Peter[1] believes that certain patients with alternating esotropia are unable to develop fusion. He[1] also believes that fusion is better developed in alternating divergent squint than in alternating convergent squint.

Forty-seven patients with alternating squint were classified as accurately as possible according to Peter's definition[22] of essentially and accidentally alternating squint. A study was made of 39 patients with alternating squint who developed strabismus between the ages of one and four. Prior to surgical and orthoptic treatment, examination by means of the orthoptoscope revealed that four of these patients had third-grade binocular vision; second-grade binocular vision was present in seven; first-grade binocular vision was present in one patient; alternation in seven patients; false projection in four; diplopia in two; and the grade of binocular vision could not be determined in 14 because of lack of coöperation or because the patients were too young. After fusion training and operation, 16 of these patients had third-grade binocular vision; 12 had second-grade binocular vision; one had first-grade binocular vision; false projection was present in five (two of the five had momentary second-grade binocular vision); alternate suppression was present in two patients; diplopia was present in two, and binocular vision was undetermined in another patient. Thus, previous to operation and orthoptic treatment only 12 patients were known to have had some degree of binocular vision, whereas, following treatment 29 patients, who developed alternating squint between

the ages of one and four, had some degree of binocular vision.

An analysis of eight patients (seven with esotropia and one exotropia) who apparently had squint either at birth or shortly after birth shows that binocular vision could not always be determined because of the age of the patients. However, prior to orthoptic treatment first-grade binocular vision was present in one; alternate suppression in three; and binocular vision was not recorded in four. Following treatment, third-grade binocular vision existed in one, partial third-grade binocular vision in two, second-grade binocular vision in three, first-grade binocular vision in one, and alternation in another. Thus, it is evident that after surgical and orthoptic treatment some degree of binocular vision was present in seven patients with alternating squint in whom strabismus existed before the age of one year. Jackson[23] obtained good results by means of orthoptic training and surgery in 44.7 percent of a group of patients with alternating convergent concomitant squint; another 44.7 perce were improved, and failures resulted in 10.6 percent. Of the failures, 8.5 percent had no fusion and 34 percent did not have simultaneous perception.

Nine patients with alternating squint were tested for aniseikonia. Six of these patients apparently had aniseikonia. Of this number, two are not wearing their lenses for cosmetic reasons, another has not obtained the iseikonic lenses, and iseikonic correction apparently caused nausea, vomiting, and marked discomfort in another patient. One patient is able to fuse for distance and near; she also is now able to knit and read with comfort. Another patient apparently fused more easily with the iseikonic correction.

AMBLYOPIA

In order to illustrate that amblyopia can be overcome, Peter[1] in 1932 listed 30 cases. My study of 85 private and clinic patients apparently confirms Peter's statement. Fifty-seven patients were between the ages of three and eight years; the average age was six years. Of this number vision improved in 36 amblyopic eyes (63 percent); a reduction in vision occurred in five eyes (9 percent); and vision remained the same in 16 eyes (28 percent). Eighteen patients were between the ages of nine and 12 years; the average age was 10 years. Improvement in vision occurred in 12 eyes (67 percent), and remained unimproved in six eyes (33 percent). Ten patients were between the ages of 13 and 21 years; the average age was 15 years. Vision improved in five eyes (50 percent), loss of vision occurred in three (30 percent), and remained the same in two (20 percent).

According to these percentages, the largest number of amblyopic patients whose vision was improved occurred in patients between the ages of nine and 12 years; the next largest number was found in patients between three and eight years and the lowest percentage occurred in patients between the ages of 13 and 21 years. No final conclusion can be drawn from a comparison of the three groups because of the larger number of cases included in the youngest group of patients and the small number of cases included in the two groups consisting of older patients. Although I believe that amblyopia should receive early treatment, especially because of the importance of adequate visual acuity in the development of normal binocular vision, more satisfactory results sometimes may be obtained with older patients because of their superior intelligence and will to coöperate. Jackson[23] obtained good results in the treatment of amblyopia in 69.5 percent of her patients; failure resulted in 30.5 percent.

DISCUSSION OF THE STATISTICAL DATA

In order to compare the results ob-

tained from the surgical treatment of strabismus and from the combined surgical and orthoptic treatment, Group I is compared with the combined totals of Groups II and III. In Group I (49 patients—surgery only), postoperatively three patients (6 percent) became heterophoric while heterotropia persisted in 46 (94 percent). The findings in Groups II and III indicate that following surgery and orthoptic training heterophoria was present in 70 patients (40 percent); heterophoria for distance and heterotropia for near in six patients (4 percent); heterophoria for near and heterotropia for distance in five patients (3 percent); heterotropia persisted in 84 patients (48 percent) and there was no record of whether heterophoria or heterotropia was present in nine patients (5 percent). The findings of Groups II and III combined (174 patients) also show that, following surgery and orthoptic training, third-grade binocular vision was present in 65 (38 percent); second-grade binocular vision in 42 (24 percent); and first-grade binocular vision in 10 (5 percent). Therefore, 116 (67 percent) had some degree of binocular vision following treatment. Thirty-seven (21 percent) did not have single binocular vision, and there was no record of the grade of binocular vision in 20 (12 percent).

Reference to tables 1, 2, 3, 4, and 5 apparently indicates that the best results were obtained in Group III (tables 4 and 5) which consists of those patients who received preoperative and postoperative orthoptic training. These findings agree with Bressler's opinion[2] that orthoptic training is of greater value when combined with surgery and that preoperative and postoperative orthoptic treatment is essential in order to obtain the best results in strabismus. Bressler[2] reported that in a group of 36 patients who received orthoptic training both before and after surgery, seven (19 percent) showed some tendency to fuse before surgical intervention; after operation 20 (55 percent) were straight and 28 (80 percent) had developed ability to fuse.

Jackson[23] reported good results following surgery and orthoptic training in 47 percent of a group of patients with right and left concomitant convergent squint; improvement was noted in 35.7 percent, and 17 percent were classified as failures. Of the failures 26.8 percent had no fusion and 9.8 percent had no simultaneous perception.

In another group, composed of patients with right and left divergent concomitant squint, Jackson[23] showed that surgery and orthoptic training accomplished good results in 55 percent, and improvement in 27 percent. Only 18 percent of this group are regarded as failures, of whom 9 percent had no simultaneous perception.

Mayou[24] administered orthoptic training alone to 64 percent of a group of patients with esotropia; in the remaining 36 percent surgery was combined with orthoptic training. Fourteen percent obtained no simultaneous perception; 16 percent had no stereopsis, but 86 percent obtained some grade of binocular vision. Of a group of patients with exotropia, 23 percent developed no binocular vision.

The reason that poorer results are obtained with those patients who are operated upon and receive no orthoptic training than with those who are given postoperative orthoptic training possibly may be attributed to the lack of orthoptic training. It has been my experience that, unless true projection takes place before operation, the same degree of deviation which existed prior to intervention may recur. This result is noted especially in those patients whose most spasmodic muscle or muscles were not weakened, because they will attempt to place the image on the abnormally corresponding area of

the retina and will have the power to do this. Nevertheless, in certain cases in which normal retinal correspondence could not be developed preoperatively, operation followed by continuous orthoptic training was apparently of benefit in producing normal retinal correspondence. The importance of attempting to develop normal retinal correspondence by orthoptic measures is illustrated by the fact that of 126 clinic patients, 33 (25 percent) had false projection before orthoptic training, while only 13 (10 percent) had false projection following orthoptic training.

Aniseikonia may be a factor in some cases in which fusion cannot be developed. This relation has apparently been demonstrated by Ames and his associates[25, 26] and by Bielschowsky[27] of the Department of Research in Physiologic Optics, Dartmouth Medical School. They have also stated that comfortable binocular vision is not possible when the difference in the relative size of the ocular images is greater than 4 percent.

SUMMARY AND CONCLUSIONS

1. Of 49 patients (Group I) with varying degrees of esotropia and exotropia, some of whom had alternating strabismus and who received no orthoptic training preoperatively or postoperatively, only 6 percent became heterophoric postoperatively. Heterotropia persisted in 94 percent of the patients.

2. Of 85 patients (Group II) with varying degrees of esotropia and exotropia, some of whom had alternating strabismus and who were given orthoptic training postoperatively, heterophoria was present in 32 percent (some degree of binocular vision was found in 61 percent).

3. Of 89 patients (Group III) with varying degrees of esotropia and exotropia, some of whom had alternating strabismus and who received preoperative and postoperative orthoptic training, heterophoria was present in 49 percent (73 percent had some degree of binocular vision).

4. By combining Groups II and III, it is evident that heterophoria following surgery and orthoptic training was present in 70 patients (40 percent); heterophoria for distance or near in 11 patients (7 percent); heterotropia persisted in 84 patients (48 percent); and there was no record of whether heterophoria or heterotropia was present in nine patients (5 percent).

5. Forty-seven (70 percent) of 67 patients with alternating esotropia or exotropia developed some degree of binocular vision.

Twenty-nine (75 percent) of 39 patients who developed alternating squint between the ages of one and four years had some degree of binocular vision following treatment. Prior to operation only 12 patients were known to have had some degree of binocular vision.

Seven of eight patients who had strabismus before the age of one year developed some degree of binocular vision.

6. That orthoptic training may be important in the development of normal retinal correspondence postoperatively is suggested by the fact that 25 percent of 126 patients with heterotropia had false projection and following orthoptic training the number was reduced to 10 percent.

7. Correction of aniseikonia seemed to be a factor in aiding fusion in two of six patients with alternating esotropia.

8. Of 85 patients with amblyopia, improvement in vision apparently occurred in 53 eyes (62 percent).

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ESSENTIAL PROGRESSIVE IRIS ATROPHY*

Case of bilateral occurrence

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While reports of this unusual condition have become more frequent in the past few years, its occurrence bilaterally is so unique as to merit special mention.

We have been able to assemble from the literature twenty-three cases of the type of iris atrophy here described. Of these, the three earliest, although their descriptions suggest a strong similarity to the disease under consideration and although they are generally included in bibliographies as authentic cases, probably do not fall into the "essential" group. The first of these is an adequate report by Johnson[1] in 1886, of a case of progressive iris atrophy in one eye following two years after injury and enucleation of the fellow eye. Hess[2] (1892) provides the only report of a bilateral progressive atrophy of the iris, with hole formation and secondary glaucoma, which occurred in a boy of fourteen years. He commented, however, that there had been a chronic iridocyclitis following scarlet fever at the age of eight years, and described deposits on the lens and anterior synechiae to confirm such a view. The iris atrophy he believed to be the result of a chronic inflammation. Harms[3] (1903) described a case which was closely analogous to that of Hess, except that it was unilateral. There was a progressive iris atrophy, hole formation, and hypertension; many fine brown deposits on the surface of the cornea, the author believed, pointed to a low-grade iridocyclitis, "similar to that in Hess's case."

The articles by de Schweinitz[13] and Waite[16] afford the most complete descriptions of the disease. The unilateral occurrence of progressive iris atrophy is cited as one of the characteristics. The disease occurs twice as often in females as in males. The age incidence is from five years (in our patient) to fifty-four years (Griscom[12]), but the majority of the cases are in early adult life. Most commonly there is early a progressive atrophy of the peripheral portions of the iris, with exposure of the underlying pigment layer. Later, formation of holes occurs and the fibers of the sphincter are involved. The pupil may become eccentric before the formation of any hole. Finally there ensues a secondary glaucoma which fails to respond to any of the usual operative procedures. In the few instances in which anatomic examination was performed, the secondary glaucoma was referred to the dense peripheral anterior synechiae which were found and to the liberation of large quantities of pigment (Rochat and Mulder,[10] Ellett,[15] Wood,[4] Licsko).[8] Waite dissents from this opinion and expresses the belief that the hypertension is directly related to the iris atrophy, with reduction of the capillary bed, and not to the anterior synechiae.

Our patient is a boy of nine years who at the age of five years was first examined in the Eye Clinic of the Stanford University Hospitals in June, 1933, because of a deformity of the pupil which the parents had observed for three or four months previously.

Examination. Vision in the right eye was 15/100—1, in the left eye 15/30—3. Normal iris markings were absent, the stroma was very thin, and in places almost transparent. Polycoria was present.

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The pupils were distorted. The left pupil was dislocated temporally, the right pupil temporally and superiorly. The sclera was thin. The globes were of normal size. The corneae were clear, 9 mm. in diameter O.U.; the fundi normal. Tension (McLean) in the right eye was 60 mm. Hg, in the left eye 50 mm. The fields could not be reliably taken.

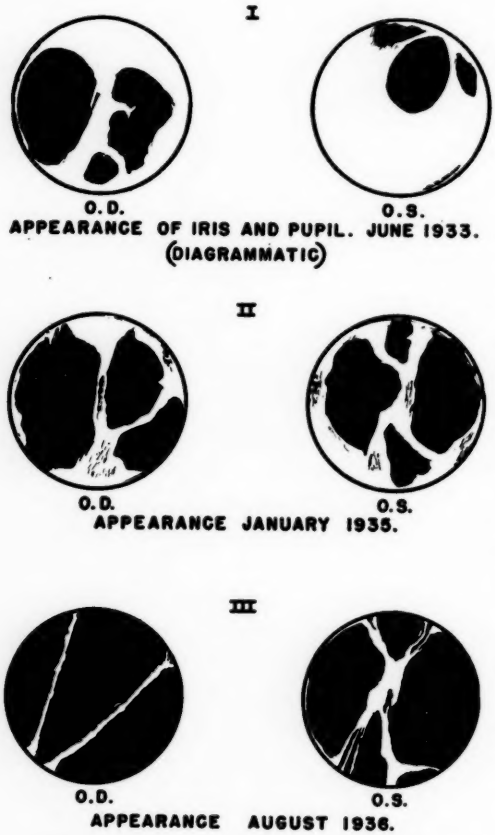

Fig. 1 (Fine and H. Barkan). Bilateral progressive iris atrophy.

After one month of medication with pilocarpine the tension in the right eye was 35 mm. Hg, and in the left 38 mm., but shortly afterward began to increase again. Cyclodialysis was performed in the right eye in August, 1933, with posterior sclerotomy, and pilocarpine was continued. One week later the right eye was soft, in the left eye the tension was 70 mm. Hg. Cyclodialysis was performed in the left eye with only very temporary control of the hypertension. A second cyclodialysis was performed in the left eye in November, 1933, and one month later a trephining operation with a peripheral iridectomy. The tension in the left eye continued throughout this period.

The patient failed to return until August, 1934. Pilocarpine had been discontinued in the interval. Vision at this time was light perception only in the right eye, and 15/40 in the left. A rough field could be obtained which showed constriction to within 25 degrees of fixation superiorly and inferiorly, 35 degrees nasally, and 55 degrees temporally. In the right eye the cornea was clear and of normal size; the anterior chamber shallow; the lens luxated anteriorly; the iris much more atrophic, with increased hole formation; there was almost total detachment of retina; the vitreous was clear; the disc not visible; the tension soft. In the left eye the cornea was clear, and of normal size; the anterior chamber normal; the lens normal; the iris more atrophic, with increased hole formation; the media clear, the fundus normal; and the tension (McLean) 60 mm. Hg.

Again the patient did not return until December, 1934. At this time an early excavation of the left disc was observed. The disc was of good color; the vessels were pushed a trifle to the nasal side. Vision was unchanged. The iris atrophy had progressed.

In January, 1935, the appearance of the irides was as indicated in the second diagram. The stroma was almost completely absent, the remaining iris tissue consisting almost totally of the posterior pigment layer. The vision in the left eye was still 15/40. The tension was 50 mm. Hg. The globe was normal in size. The patient attended public school and with

a little special attention was keeping up with the other children in the class. Pilocarpine had been used regularly, three times daily. The use of diathermy over the ciliary region as a means of controlling the glaucoma was considered but the discouraged parents refused further operative procedures.

The patient was seen again in September, 1935. At this time the left globe was distinctly larger than the right; the sclera thin and bluish in color. The vision was now reduced to 15/200. The atrophy of the iris had advanced slightly but the general appearance of the iris pattern had changed little. The optic disc appeared very pale and was deeply excavated. The tension was 70 mm. Hg. (McLean). At this time cortin, as a remedy for glaucoma, made its enthusiastic entrance into ophthalmic literature; the patient was given daily injections of Eschatin for a period of a week without any significant change in the intraocular tension. The parents still could not be persuaded to allow further operation.

The patient was last examined in August, 1936. He had not been brought back to the clinic for almost a year, but pilocarpine had been continued quite regularly. In July, 1936, there had been a rather sudden decrease in vision. The parents had consulted another oculist who had found the intraocular tension to be 85 mm. Hg. A second trephining operation had been performed and the tension had been about 50 mm. since that time.

At the last examination the vision in the left eye was about 5/200. The central field extended only a few degrees about fixation. A small portion of the peripheral field remained in the upper temporal quadrant. There was definite buphthalmos. The disc was very deeply excavated and china white in color. The recent trephine opening was covered by a large translucent bleb. The anterior chamber was very shallow. Tension was 55 mm. Hg. The iris atrophy had progressed as indicated by the third diagram. The remaining tissue consisted entirely of the pigment layer. No trace of the stroma was visible. The right eye was slightly shrunken; there was a total detachment of the retina, visible beyond the equator of the subluxated, cataractous lens; light perception was present. The iris was entirely absent, with the exception of two narrow strands of the pigment layer.

In the course of observation of the patient from 1933 to 1936 repeated examinations were made with the slitlamp. At no time were there observed any of the signs of a chronic iridocyclitis. A complete physical examination revealed no other abnormalities. No familial history of ocular abnormality could be obtained. The patient has one younger brother, aged three years, who is entirely normal.

In reviewing the operative treatment of this patient, and in speculating upon the relationship between the glaucoma and the iris atrophy, it is interesting to note that a single cyclodialysis with a posterior sclerotomy controlled the hypertension in the right eye, but was followed by detachment of the retina some months later. On the other hand, six operations were ineffective in controlling the hypertension in the left eye. The iris atrophy progressed about equally in the hypo- and the hypertensive eyes.

Of the many theories which have been advanced to explain the occurrence of this unique disease, none is entirely satisfactory. De Schweinitz, who is disposed to look upon the atrophy as a manifestation of premature cellular degeneration or "abiotrophy," concluded that we are entirely in ignorance of the etiology of this condition. The contrasting hypothesis of Kreiker,[14] that the dissolution of the iris resulted from a renewed activity of

the cytolytic process which resorbs the pupillary membrane in intrauterine life, has been contested, not unjustly, with the fact that the disease often begins in late adult life. The advanced stage of the atrophy in our patient at the age of five years suggests that it may have begun at a period considerably earlier and tends to lend confirmation to Kreiker's view. In this connection it is of interest to note that, while in the great majority of cases the iris atrophy precedes the intractable glaucoma by a period of years, in our patient the iris atrophy and glaucoma were concurrent. This raises the question as to whether the glaucoma is truly a secondary glaucoma or whether there may not be a common etiology of the atrophy and the glaucoma. How long the iris atrophy may have existed in our patient before it was observed is a matter of interesting speculation.

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THIN LENSES AND BIFOCALS FOR HIGH MYOPIA*

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Highly myopic patients are often more concerned about the increasing thickness and weight of their lenses than about the advance of their myopia.

For many years the two objections, thick edges and lens weight, have been met by the grinding away of the peripheral lens surfaces, restricting the correction to a central circle. Lenses of this design are known to opticians as "Lenticular."

Concave Lenticular lenses are made in two forms:

1. With a convex periphery, as in figure 1, A, B.

2. With a flat periphery, as in figure 1, C, D.

The convex periphery leaves a larger central circle but creates a heavier lens. This type can be put into a rim, but the sharp edge does not fit well into a rimless mounting. When lenses of any considerable edge thickness are fitted into rims it is an advantage to require that all of the bevel be to the rear of the rim.

The flat Lenticular lens has a square edge which a good workman can fit well into rimless frames (fig. 1, E).

It is not necessary to order toric curves for highly myopic eyes. A cylinder if needed can be ground on the anterior surface.

In ordinary Lenticulars the margin of the concave disc (fig. 1, B, D) is not perfectly sharp and well defined. In the polishing process it becomes slightly rounded, producing an aberration blur if the eye reaches it. This marginal blur is more manifest in the Lenticulars with the convex periphery. In these there are also more apt to be reflections due to prismatic effect and an unsightliness due to the appearance from the front of a deep circular band around the disc (fig. 1, A).

Obrig (Arch. of Ophth., 1934, v. 12, p. 2) described improved, lenticular-type, strong concave lenses. A 25- to 30-mm. diameter, circular, spherical, concave surface of the desired power is generated on a lens blank previously made thin and flat. Any desired cylinder can be ground on the front surface. The result is an ultrathin lens known as a Myodisc lens (fig. 2, A, B).

One of my corrections (—10. D. sph. ⌯ —0.75 D. cyl. ax. 180°) so made with a 29-mm. circle, has an edge thickness of only 2½ mm. The margin of the concave disc of this lens, shown in figure 2, B, is extremely abrupt or sharp. When the eye reaches this margin there is no blur; the eye passes directly to the plano cylinder as if it had reached a lens margin.

It is desirable to set these lenses as close to the eyes as possible and well up. In rimless styles, the drop oval perimetric or orbal shape is advantageous. The field of vision afforded by the disc is ample, provided that the lenses are placed close to the eyes. Clarity of vision is greater than that afforded by a full-sized lens which, because of its weight, has dropped too far away from the eyes or slipped too low.

An ultrathin lenticular one-piece myodisc bifocal is also described in Obrig's article. Two concave discs are ground on a flat lens blank. A small arc of the lower disc is sacrificed, as shown in figure 2, C, D. The lens has two widely separated optical centers. I find this lens unwearable. A prism, base-front (fig. 2, C) is

*Read before the Eye Section of the Philadelphia County Medical Society, Nov. 1, 1934.

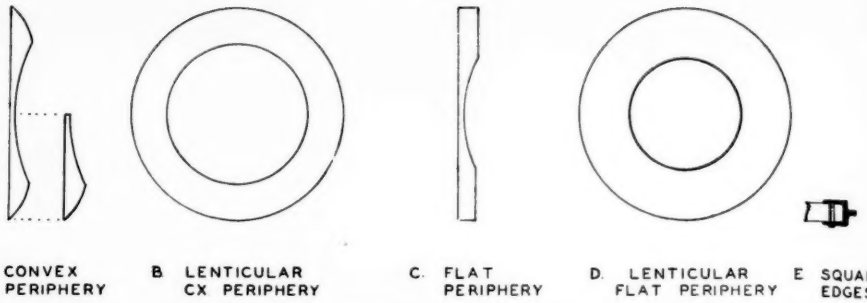

Fig. 1 (Olsho). A. Note prismatic effect at margin of circle. B. The convex periphery affords a larger circle but a heavier lens. C.D. The flat periphery creates a smaller circle and a thinner lens. The square edges of the flat lens fit better into rimless mountings.

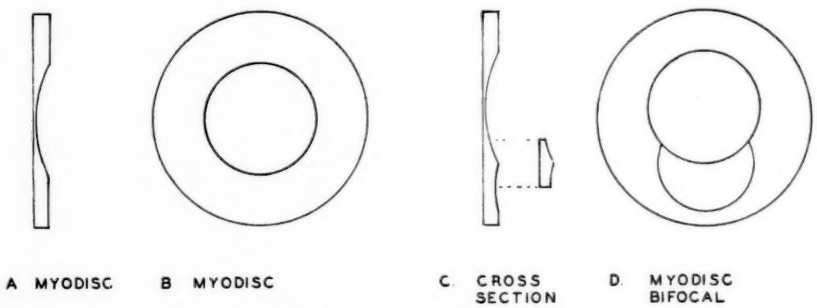

Fig. 2 (Olsho). A.B. Ultrathin edges on high-minus corrections. The margin of the circle is sharp. The eye passes into the plano without encountering an intervening blurred zone. C.D. Myodisc bifocal. Independent optical centers are widely separated, leading to confusion in the transition to the reading zone. Base-front prism. Double images. Broad blind zone.

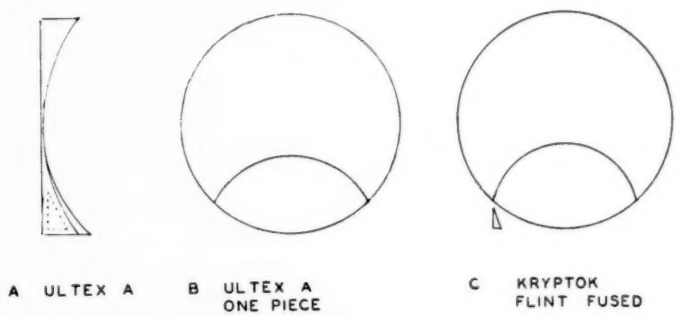

Fig. 3 (Olsho). A. Ultex "A" cross section. In the reading zone of a high-minus lens the eye encounters a strong prism, base down. Nasally there is a favorable prism, base in. B. Ultex "A" one-piece bifocal. Heavy base-down prism also in the segment. This is the least suitable bifocal for high-minus corrections. C. Kryptok bifocal. Fused flint segment. The thick edges of the segments are down, intensifying the prism, base down, present in all minus corrections.

created and a wide blind zone exists between the upper and lower lens portions.

Bifocals for myopic eyes

It is apparent by referring to figure 3, A that when the eye is directed to the lower part, or reading zone, of any strong concave lens it encounters a heavy prism, base down. By the selection of the correct segment in a bifocal for a myopic eye this strong, base-down prism can be partially neutralized or at least not intensified.

In the commonly used Ultex one-piece bifocal, for example, with the semilunar segment "A," the construction is such that the lower margin of the lens becomes greatly thickened, and this generates additional prism base-down (see fig. 3, A and B). Moreover, in the commonly used Kryptok fused bifocals the horseshoe-shaped button becomes thicker toward its lower margin. This means added prismatic effect base-down in a concave correction (see fig. 3, C).

There is already a heavy base-down prism in the lower zone of a high-minus lens. This base-down prism becomes excessive if either of the two types of bifocals previously mentioned is ordered for a highly myopic eye.

On the other hand, bifocals whose design is similar to those shown in figure 4, A, B, C, D, have segments of which the thick edges are up. These tend to diminish—or, at least, they do not intensify—the prism, base down, that is present in the reading zone of a strong concave lens. It seems good practice to use segments of this design only when the distance correction or its horizontal meridian is concave, and to use segments whose thin edge is up when the distance correction or its horizontal meridian is convex.

Desiring to obtain a thin bifocal —10 D. sph. ⌯ —0.75 D. cyl. ax. 180°, add +3.00, I had bifocals constructed of each of the types shown in figure 4, A, B, and C, and had them made flat lenticular, specifying that a circle 28 to 30 mm. in diameter should be used and that the top of the segments should be 3 mm. below the optical centers of the distance lenses. The results were similar. The thickness of the lens edge in the thinnest pair was 5 mm. The lenses were quite heavy. In each instance the segment was found to be fused into the anterior almost flat surface, as shown in figure 4, D. The

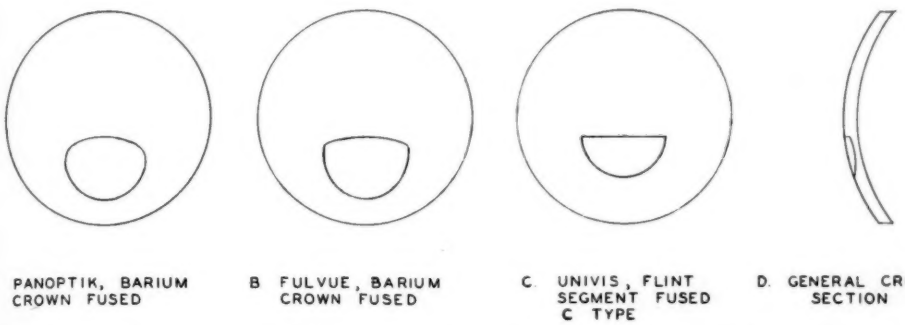

Fig. 4 (Olsho). A. Panoptik, Barium Crown modern, fused segment. B. Fulvue, Widesite "A," Barium Crown modern, fused segment. C. Univis "C," Flint modern, fused segment. D. The segments are fused into the anterior surface. There is no angle for reading. The thicker edges of the segments are up; thus it is more favorable to minus corrections. Ultrathin lenticular lenses are impossible except with a very small circle and segment.

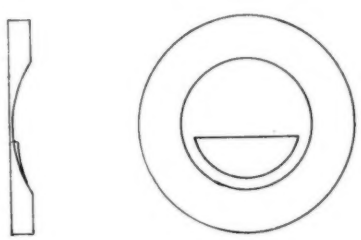

Fig. 5 (Olsho). A. The segment is properly angled. It does not add to lens thickness. The Opifex segment is extremely thin. B. The thin segment presents a very fine line anteriorly. Segment and lens are monocentric and homogeneous.

inclination for the reading segment would be more nearly correct were it mechanically possible to have the segment fused into the concave posterior surface.

This last thought gave rise to the idea of reverting to a cemented bifocal but utilizing modern bifocal knowledge in its design.

The Myodisc with Monocentric Cemented Segments

The concave myodics single lens, previously referred to, is used in the construction of the Myodisc Cemented Bifocal. This cemented bifocal possesses a degree of optical perfection impossible of attainment, up to the present time, in any one-piece or any fused bifocal. It has certain disadvantages not completely separable from bifocals of the cemented type.

The well-known disadvantages of ordinary cemented wafers include visibility and the possibility of loosening of the wafer or the chipping of its edges. These disadvantages have been mitigated in the Myodisc Cemented Bifocal, nevertheless, these bifocals are suitable mainly for careful and fastidious patients. Mine have been satisfactory in every respect for two years and give promise of continuing so indefinitely.

To obtain the best optical results the bifocal must be constructed in conformity with the specifications to be enumerated, and these require a high order of workmanship:

The segment or wafer is of the type known as Opifex. It is ultra thin, with keen, knifelike edges. These segments give the bifocal an almost one-piece effect. The wafer is fragile and requires support or a "backing" in the grinding and handling. The thinness makes for lightness and invisibility. The surface that is to make contact is absolutely true to the concave surface of the major lens, tending to make it adhere with a minimum of the usual cement.

The segment is ground with its thick edge up (fig. 5, A). The upper edge is straight across and has a very fine ground surface. This edge takes a slant of 10 degrees, downward and backward, much of which, however, is lost, as the segment rests in its concave bed. Though this upper edge is thicker than its rounded lower margin, it presents from the anterior aspect of the lens only as an exceedingly fine line. The top edge of the segment is placed 2 to 3 mm. below the center of the concave-disc circle. It is not so necessary optically to have an inset,

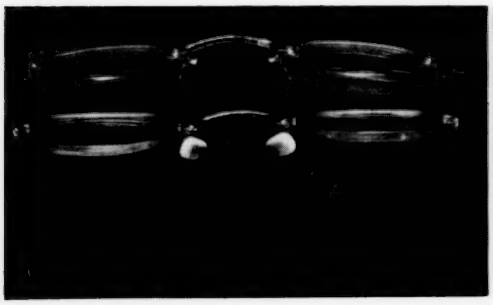

Fig. 6

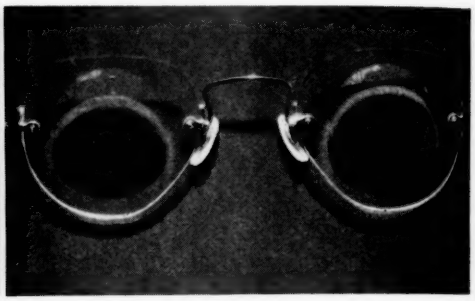

Fig. 7

Fig. 6 (Olsho). Contrasting the edges of a modern fused bifocal and the Myodisc with monocentric cemented segments. Both pairs are of the same focus (—10.00 D. sph ⌯ —0.75 D. cyl. ax. 180°, add + 3.00).

Fig. 7 (Olsho). Myodisc with monocentric cemented bifocal segments. The visibility is intensified here by the background and lighting.

for the nasal halves of a pair of strongly concave lenses act as a pair of prisms, base in. Therefore the eyes may not have to converge to receive the rays emanating from some near object.

The rounded lower margin of the cemented segment shown is an arc that is concentric to the circumference of the concave disc major circle (fig. 5, B). It will be observed that the segment is amply large.

Optically the wafer is made monocentric with the distance lens. There is, therefore, no blind area, or "jump," in the eye's transition to the reading zone. Furthermore, there is a remarkably slight loss of clarity when looking at the floor through the reading zone, even with the plus 3 add, in my case, for the residual correction is still a minus 7 diopter.

As the wafer lies within the concavity of the disc it naturally takes an adequately tilted position for reading. This is not true of the segments fused into the anterior surfaces of the several modern fused bifocals (fig. 4, D). The cemented segment does not necessitate adding thickness to the lens, as is the case with fused segments.

The edges of the cemented segment are not exposed, for it lies well recessed within the protecting margins of the major circle.

Since both the cemented segment and the major lens are of crown glass, the combination is homogeneous and the problem of combining unlike types of glass, as in fused bifocals, does not arise.

It is best to clean the lenses with soap and cold water.

Subsequent to the description of the Monocentric Cemented Myodisc Bifocal, an Ultra Thin Lenticular Barium Fused Panoptik Bifocal for highly myopic patients has been made. The first pair was made on my prescription. The circle was kept round in the presence of the cylinder by the generation of a cylinder on the flat periphery. The lens has great beauty. The segment is quite small and less visible. It is permanent but more expensive than the cemented myodisc bifocal. The button is fused on the front surface (not the better position). In order to attain the thin edge (2 mm.) on the same prescription (—10. D. sph. ⌯ —0.75 D. cyl. ax. 180°) the myodisc circle had to be reduced to a diameter of 25 mm. The distance field is therefore correspondingly diminished. The wearer has found this lens to be somewhat less efficient than the cemented lens.

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REQUIREMENTS OF GOOD DESK LIGHTING*

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Satisfactory local lighting when the source of light is required to be in the frontal hemisphere is one of the unsolved problems of lighting engineering. An outstanding example of this is the desk lamp. Some of the most important requirements of good lighting are adequate intensity, absence of glare both on the work and in the field of view, and a well-balanced distribution of brightness in the field. In case of most desk lamps there is high glare on the work, and very uncomfortable and irritating glare in the unit itself; the light is of objectionable color, the diffusion is poor, and the distribution of light and brightness in the field is extremely bad.

In the designing of desk lamps and other portable lighting units, both opaque and translucent reflectors and housings, pendant and inverted, have been used. If an opaque reflector turned down is used, high glare is obtained from the opening of the reflector which is very near to the eyes; and the work is glaring, depending upon the reflection characteristics of its surface, the lack of diffuseness of the light, the spread of light, and the distance of the opening of the reflector above it. Very often the effect is that of a spotlight. In order to shield the eyes from the glare of the opening of the reflector, the tendency in designing and using this type of unit is to lower the opening below the level of the eyes. In proportion as this is done the area of illumination becomes smaller and still more spotlike in effect, and the glare on the work is increased. This limited spread of illumination is undesirable not only because it does not illuminate all the working field, but also because the glare of the small, highly illuminated area is greatly increased by the sharp contrast with its darker surroundings. The extreme of this is obtained when there is no other source of light or general illumination in the room. Another well-known example of this disturbing effect is the highly illuminated screen with its dark surroundings in the motion-picture theater. A further objection to placing the unit low in the field of view is that its short distance from the surface illuminated does not give such diffusing means as may be used sufficient chance to produce their full effect. In this respect it is obvious that the farther diffused light travels, the more completely are shadows eliminated, the wider is the angle of scatter of the light reflected from the work, and the slighter the chance of the eyes' receiving enough of this light to produce glare. The fundamental difficulty, then, in designing desk lamps has been that in order to shield the eyes from the glare of the opening, the unit is placed too short a distance above the work. This is the chief factor in giving the characteristic spotlight effect and the high glare on the work. Glare is subtracted from the unit at the expense of adding it to the work. A satisfactory compromise is not possible without the use of glare-eliminating devices.

In the use of opaque reflectors turned up, or totally indirect lighting, two principles have been employed. In one, the ceiling is used as a reflector; in the other a combination is made of a bottom- or side-silvered lamp and a reflecting housing above it to direct the rays downward. In the former of these types of unit fairly good effects are obtained but it is difficult

* From the Research Laboratory of Physiological Optics.

to get enough light on the work to serve the purpose for which a desk lamp is used. In fact it is no more a local lighting device than is a ceiling fixture—scarcely as much, for the spread of light to the ceiling is much more general than in the case of the indirect lighting fixture. The only claim such a device could have to be called a desk or table lamp, for example, is the fact that it may rest on a desk or table rather than be suspended from the ceiling. Further, from the standpoint of the optimum comfort of the eye there is the disadvantage here that is found in all indirect lighting from the ceiling; that is, there is the effect of too much light and brightness in the upper part of the field of view.

The idea of using a bottom- or side-silvered lamp in connection with the second type of indirect unit just noted was disclosed by one of the writers (C.E.F.), about 13 years ago, to the manufacturers of equipment to be used with silvered lamps. This unit is still in use and has some very good features. However, as in case of the units of the direct type discussed above, in order that the bright opening of the reflector shall not be in the field of view it has to be lowered too close to the work. The result is a narrow circle of illumination, a spotlight effect, and high glare on the work.

In case of translucent housings turned down, there is glare both from the opening and from the enclosing walls of the housing. The effects and deficiencies of the pendant type of unit are apparent in proportion as these walls are dense, and in proportion as the transmission is increased, the enclosing walls are glaring. In case of translucent housings turned up, harmful glare is experienced from the housing itself when the reflector is of low density; and when it is of high density the unit has the disadvantages of the inverted opaque reflector already noted. The inverted translucent reflector of low density has been used primarily, if not entirely, in the designing of table and floor lamps, in which case a supplementary shade has usually been employed. This type of unit will be discussed in greater detail in the comparison of desk and table lamps given later in the paper.

A LAMP WHICH SATISFIES THE REQUIREMENTS OF GOOD DESK LIGHTING

It is the purpose of the present paper to describe a desk lamp that has the following features and advantages. (1) The unit itself is absolutely glareless with lamps of either high or low wattage. (2) It can be placed at a sufficient height above the work to give a wide field of illumination. Its construction also is such as to increase the spread of light over and above that which would result from its height alone. (3) The light is well distributed and well diffused. (4) Glare on the work is reduced to a minimum. (5) High intensities of light may be obtained, and daylight color and composition may be had if desired. Also, if desired, the natural whiteness of Mazda light may be preserved by the omission of all reflecting surfaces within the housing. A very good color of light may thus be obtained without the use of correcting filters. In this connection it may be noted that a great deal of the color we are accustomed to attribute to Mazda light is due to the selective action of the reflectors used in designing lighting fixtures and equipment. Very few if any reflecting surfaces used in commercial lighting reflect the different wave lengths of light with equal strength. The effect of this is usually to unbalance the light reflected in the direction of stronger color. A type of housing in which no reflecting surfaces are used and which gives despite this a very satisfactory physical efficiency has been described in a former paper.[1] (6) An up-

ward component can be obtained if desired by leaving a properly designed and shielded opening at the top of the reflector or housing. This has the advantage of adding to the strong local illumination a fair amount of general illumination. (7) Gross steps in variation of intensity to suit individual needs, differences in type of work, and so forth, may be produced by the use of a three-filament lamp. Finer changes can be produced by incorporating in the structure of the unit the shutter control we have devised for varying intensity of light.[2] By means of this device the intensity can be changed in continuous series from full to low or over any range that may be planned without change in the color or composition of light or in the size, shape, or location of the illuminated area.

This adjusting of the intensity to suit individual needs and situations is a most important factor in the adaptation of light to the welfare and requirements of the eye. The intensity of light preferred by different individuals for the same work and different kinds of work varies over a wide range. Among the factors affecting the amount of light preferred, the following may be noted: age, the refractive condition of the eyes, clearness of media, size of pupil, susceptibility to glare, health of the eyes, and keenness of light and space discrimination.

Variable placement of light is also a very important factor in local lighting. This is especially important as a means of eliminating glare on the work. Indeed, it is the only means known to us at the present time for completely eliminating glare on the work. A model of desk lamp has been devised by us embodying this feature in combination with the more important of those noted above. That model, however, will not be described in this paper.

The general plan of the unit to be described in this paper is as follows:

(1) The unit may be of the direct or the direct-indirect type.

(2) To prevent glare from the opening of the housing when it is elevated to the distance above the work that is required to give a wide spread of light and a minimum of glare on the work, a glare baffle of the egg-crate or some other type is suitably positioned across the opening. Baffles of this type not only eliminate glare from the unit itself, but they aid in reducing glare from the work. That is, they cut off many of the oblique rays which would otherwise be directed into the eyes by specular reflection from the work. To these rays glare from the work is due.

(3) An increase of spread of light is obtained by making the lower part of the housing of nonreflecting vanes or louvers so spaced and so inclined outward and downward at such an angle as to permit of the radiation of light laterally from the lamp but at the same time to shield the eye completely from glare.

(4) The light on the work is diffused by passing through Belgian flashed opal glass. A sheet of this is positioned above the glare baffle across the bottom of the unit and smaller sheets of it are placed immediately behind the side louvers. If desired, other diffusing means can be used, such, for example, as providing the lamp with an enclosing globe or a partially enclosing bowl of diffusing or light-scattering glassware; or the housing is provided with a diffusing lining towards which the light is directed and then reflected to the working plane.

Drawings of one model or type of unit are shown in figures 1 and 2. It is obvious that the principles noted above can be effectively embodied in different designs. The chief purpose of this paper is to outline and discuss essential principles and requirements.

The side baffles forming the lower part of the housing consist of downwardly and outwardly inclined vanes or plates spaced apart in a vertical direction by distances considerably less than the vertical distance between the top and bottom plane of each vane. Each of the vanes is in the form of a hollow frame which may have a rectangular, circular, or other shape to conform to the shape of the horizontal cross-section of the enclosure that is desired. In the model shown in figure 2, the inner edge of the upper vane is fastened directly to the housing and the two lower vanes are supported on slender rods that are also attached to the housing. In another model, all the vanes are supported on slender rods attached to a framework within the housing in such a way that the outer edge of the vanes does not extend beyond the housing. Provisions may be made for changing the spacing of the vanes when desired, such as are shown in figure 2, or of any other suitable type. Both the upper and lower surfaces of each vane are painted flat black for the purpose of completely eliminating glare. The breadth of the vanes, their number, and the distance by which they are separated; their angle of inclination, their relation to the filament of the lamp, and their surfacing are all important features in securing the desired effect.

The bottom baffle shown at A in figure 2 has a cellular construction similar in appearance to an egg-crate. It consists substantially of two series of vertical partitions extending across the opening of the enclosure at right angles to each other. The partitions extending in each direction are parallel. In the model shown in figure 2 they are spaced apart by about two inches and are approximately one-and-one-fourth inches deep. Through the downwardly extending passages formed by these partitions, the greater part of the light is allowed to pass to the plane of work, only such rays being intercepted as will produce glare in the eyes of the person or persons at or near the desk which the lamp is intended to illuminate. If one were directly under a unit provided with this baffle, glare would be experienced only when the gaze is directed upwards. In all other positions the eye is protected in all directions. In order that

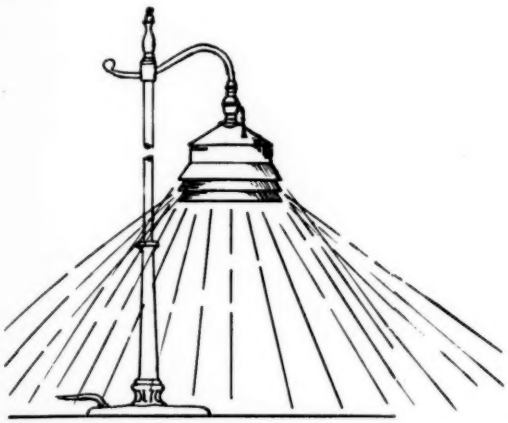

Fig. 1

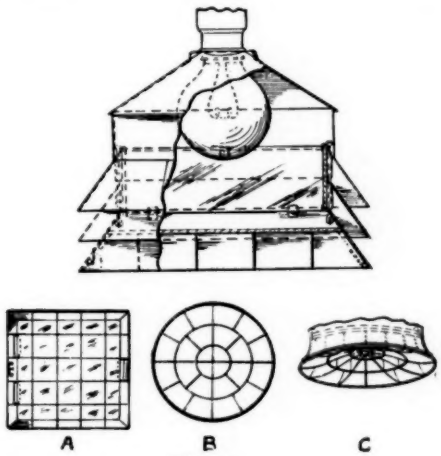

Fig. 2

Fig. 1 (Ferree and Rand). Drawing of desk lamp featuring spread of light obtained.
Fig. 2 (Ferree and Rand). Drawing of desk lamp showing in greater detail the construction of the baffles or devices for protection against glare.

the protection shall be complete the partitions are surfaced flat black. When the unit is raised to the proper height above the material to be illuminated and is positioned in proper relation to the material and to the worker, a wide spread of evenly distributed and well-diffused light is obtained and both the side and bottom baffles, as seen from the position of the worker, are either not luminous at all or else they have a dull luster or soft silvery sheen of such low brightness as not to cause annoyance or discomfort to the most sensitive eye. Further, no light falls on the face other than that which is reflected from the working plane.

At B and C are shown two other types of bottom baffle which may be used to good advantage in case the housing is made circular rather than rectangular in shape. In B the baffles are shown arranged in the form of concentric circles. Partitions circularly disposed, however, shield the eye completely only when the gaze is directed along the common radius of the circles. In all other directions glare is experienced. In order to shield the eye in all directions radial segments are inserted between the circles at suitable places. While good results are obtained with this form of baffle, we have not found it to be so entirely satisfactory as the egg-crate type shown at A. In C also the partitions forming the baffle are both circular and radial, the radial partitions being curved so that the effect is that of a bottom slightly convexed upward. Intersecting the radial partitions at suitable vertical levels are circular partitions. Either illuminated or dark, this baffle gives a very pleasing effect. Both it and the type of baffle shown at B, however, obstruct the downward passage of light more than the circular or egg-crate construction shown at A.

To insure that all the light which passes to the surface to be illuminated is adequately diffused, above the bottom baffle in the model shown in figures 1 and 2 is a plate of Belgian flashed opal glass; also, the enclosure formed by the side baffles is lined with the same glassware. The hinged construction at the bottom of the unit is such that the baffle and diffusing plate may be readily lowered for replacing the lamp or cleaning the diffusing plates. As already indicated, the diffusing plates thus far used are of imported Belgian flashed opal glass, both surfaces of which are smooth. This glass has an especially high coefficient of both diffusion and transmission and its smooth surfaces are of advantage in cleaning. If color corrective glassware is used it should be etched or some other means provided for diffusion. If desired, other diffusing means can be used, such as are noted in (4) above.

The unit as described in this paper and as represented in the drawings is a laboratory product, constructed to illustrate a principle. It has not had the benefit of skillful and artistic designing. The stand, for example, is a shortened and modified floor-stand selected because a desk-stand tall enough to give the desired effect was not obtainable. The stand should be made adjustable in height to suit the needs of workers of different heights. To give the best results for a person of average height, the bottom of the unit should be at least 20 inches above the plane of work. When positioned at this height an area of six feet in diameter can be satisfactorily illuminated with light of good intensity, distribution, and diffuseness.

In connection with a discussion of desk lamps and the requirements of desk lighting, it may be noted that desk lamps and table lamps are customarily, and rightfully should be, of different design. Table lamps are usually mounted on a central stem with a supporting base beneath. In

the days of the use of kerosene as an illuminant they were quite common. They were used to illuminate a dining-room table, or in the living room were usually given a central location on a table or stand for the purpose of general illumination. They were not good to work by but were usually supplemented by reading lamps, sewing lamps, and so forth. They were not used for desk illumination. The student lamp or some other lamp of similar design was used for this purpose.

Desk illumination presents a problem different from table lighting. The center of the desk is usually occupied by the work and the lamp is placed at the back of the desk or in some other unused and suitable location. The lamp is made to extend out towards the work from the stand or support with the intention that the area of work shall receive the highest intensity of illumination, not the base of the lamp as happens in case of table lamps. It is easy to eliminate glare completely from the desk lamps. To do this is not so easy in case of the table lamp.

Table lamps are rarely sold as desk lamps. A notable exception to this is the lamp recently recommended by the Illuminating Engineering Society. This lamp is distinctly a table, not a desk, lamp and was modeled, so we understand, after an old type of table lamp. Properly speaking, it is not suited for the illumination of a desk. Further, the protection provided against glare is by no means adequate. In this connection it should be remembered that simple glare may be caused even by completely diffused reflected or transmitted light, if the intensity is sufficiently high; that is, simple glare is a too-high brightness due to overstimulation of the sensorium by high intensities of light. There is, moreover, the experience of poorly distributed light and brightness, which is quite uncomfortable. The face and eyes receive entirely too much light directly from the lamp, often more than does the work. In this way a very annoying discomfort may be experienced even though no surfaces of excessively high brightness are visible either in or around the lamp from the position of work. Such light, coming from above, is particularly annoying because it falls on the lower half of the retina, which is extremely sensitive to glare. This experience will always follow when the source of illumination is above the level of the eyes, if baffles are not used in the construction of the lamp itself or if a shade is not worn over the eyes. In addition, we have here the difficulty which is always encountered with wide-angled sources of light. With a luminous surface of large area acting as source it is almost impossible to escape the angle of specular reflection from the work. That is, just in proportion as the light falls on the work from a large number of directions, it will be specularly reflected in a large number of directions, rendering it difficult to place the eye in relation to the work so that it will not receive some of these glare-producing rays. The glare from the keys and other parts of many typewriters, for example, is particularly bad with this lamp.

SUMMARY

In this paper the requirements of a good desk lamp are outlined and discussed, and one model constructed as a sample is described.

A satisfactory desk lamp should embody the following features:

(1) Adequate intensity of light should be provided, also a means for varying intensity to suit individual needs and different types of work without changing the color and composition of the light or the size, shape, or location of the illuminated area.

(2) The unit itself should be glareless

when used with lamps of either low or high wattage.

(3) It should be placed at a sufficient height to give a wide field of illumination. This spread of light can be increased by certain provisions in the construction of the unit, such as are described.

(4) The light should be well diffused and evenly distributed on the plane of work and there should be a well-balanced placement of light and brightness in the field of view. For securing this latter condition, an upward component of light is an important factor in addition to the complete elimination of glare from the lighting unit itself.

(5) Glare on the work should be reduced to a minimum. Diffusion of light and height of unit above the plane of work are important factors in securing this result. The most effective means for eliminating glare on the work, however, is a suitable provision for varying the placement of light.

(6) The light should be made to approximate daylight in color and composition. For many eyes, particularly in certain pathologic conditions, this is almost imperative.

2609 Poplar Drive.

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ENUCLEATION WITH IMPLANTATION OF FOREIGN SUBSTANCES INTO TENON'S CAPSULE*

A TECHNIQUE IN WHICH NO SUTURES ARE BURIED

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Simple enucleation and enucleation combined with various methods of suturing the conjunctiva and the muscles, have not proved satisfactory from the cosmetic standpoint. The insertion of a sphere into the sclera, as suggested by Mules,[1] produces excellent cosmetic results, but implants are not tolerated well by the scleras of old people nor by chronically inflamed eyeballs, hence, because of these and other reasons the glass ball is often expelled. This complication does not occur so frequently in the operation devised by Fox,[2] for he uses a smaller gold ball, 13 to 14 mm. in diameter. He also tenotomizes the recti, since he believes that the traction of these muscles is the probable cause of the expulsion of the spheres. Because one of the principal advantages of any enucleation operation, i.e., good motility, is diminished by cutting the tendons, various experiments were made in implanting into Tenon's capsule fat, gold and glass spheres, pieces of bone, and even rubber sponge. With the methods employed it was necessary to bury catgut or silk. Suppuration, which sometimes followed this procedure, and the difficulty of obtaining complete closure of Tenon's capsule by means of catgut, led to the conclusion that there were two possible reasons for the loss of these implants. The first was that the catgut was often unsterile and the second that with the use of catgut, complete closure of Tenon's capsule was not obtained. Further experimentation and clinical experience resulted in the adoption of the technique to be described, which I used as early as 1921. A review of the literature of the past fifteen years, including the more recent textbooks of ophthalmology, seems to give no reference to this technique which, although simple, apparently produces satisfactory results.

Preoperative Preparation. Thorough sterilization of the conjunctiva is advantageous, and when the indications for operation are not urgent, inflammation of the eyelid borders and conjunctiva is treated. The eyelid borders and the surrounding field are painted with three-percent tincture of iodine and wiped with 70-percent alcohol; a 1:2500 solution of metaphen is instilled into the conjunctival culdesac. Local anesthesia with deep orbital injections, as employed by Labat,[3] is satisfactory and has been used most frequently in performing this operation.

Instruments and Equipment. 1. Speculum with solid blades (Lancaster's or another model[4]); 2. Stevens scissors with long blades; 3. Long bladed mouse-tooth and tissue forceps; 4. Two small hemostats; 5. Two fixation forceps without catch; 6. Two fixation forceps with catch; 7. One enucleation forceps** (fig. 1); 8. Introducer for Mules's spheres (Carter); 9. One enucleation scissors (Reese); 10. One tonsil snare (Eves); 11. Long curved cutting needle, armed with No. 5 twisted paraffinized black silk for Tenon's capsule. Plain 0000 catgut with atraumatic needles† for the conjunctiva; 12. A 12- to 13-mm. gold ball.

TECHNIQUE OF OPERATION

First stage: The speculum is introduced

*This study was aided by a grant from the Ophthalmological Foundation, Inc.

**George Tiemann and Sons, New York, N.Y.

†Davis and Geck, Brooklyn, N.Y.

and its blades are widely separated. A subconjunctival injection is made completely surrounding the limbus with one minim of 1:1000 epinephrine to every ten minims of two-percent procaine. This causes ballooning of the conjunctiva, thus facilitating the dissection. The conjunctival and subconjunctival tissue is then picked up at the limbus with tissue forceps and carefully separated from the cornea. Into this opening one blade of the scissors is passed and the conjunctiva and Tenon's capsule are dissected back to the insertion of the recti muscles, continuing around the entire cornea. The recti tendons are then picked up with a strabismus hook and separated from the eyeball as close to the sclera as possible. The superior rectus is tenotomized first. The hook is now swept around the eyeball and the remaining attached tissues are severed. All tendons are cut close to the sclera, except that of the medial rectus, one millimeter of which is left so that it may be grasped with fixation forceps.

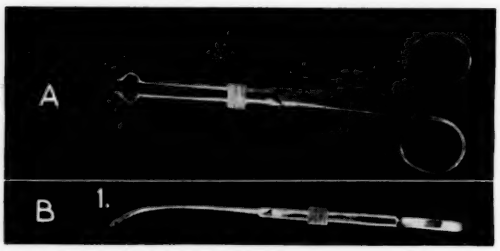

Fig. 1 (Berens). A, Enucleation forceps. B, Lateral view of enucleation forceps.

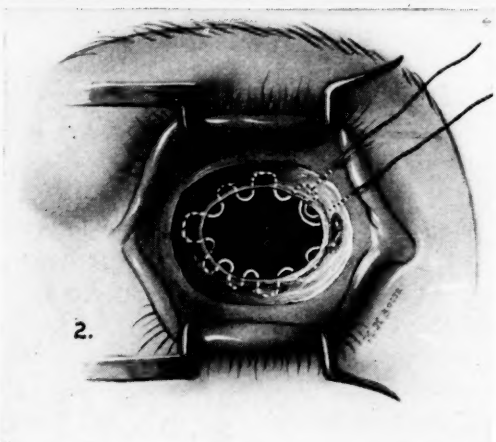

Fig. 2 (Berens). Showing eye enucleated and double-armed purse-string silk suture passed through the conjunctiva picking up Tenon's capsule and the stumps of the muscles.

Second stage: The enucleation forceps (fig. 1) is passed behind the eyeball from the nasal side of the orbit and grasps the optic nerve, carrying the eyeball forward. The optic nerve is cut as far back as possible with Reese's curved enucleation scissors. Superior and inferior oblique tendons should be cut after the eyeball is drawn forward. A large sponge, wrung out in physiologic salt solution, is placed in Tenon's capsule, and firm pressure is applied to control bleeding. Recently Eve's tonsil snare has been used with success and less hemorrhage.

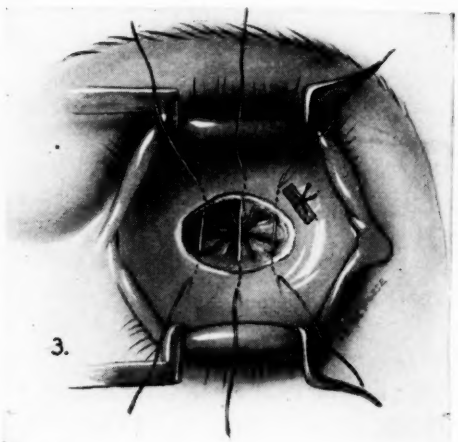

Fig. 3 (Berens). After the implantation of the foreign substance the double-armed suture is tightened, the edges of Tenon's capsule approximated, and the suture tied over a piece of rubber tubing. Three conjunctival sutures are in place.

Third stage: One needle of the double-armed suture of No. 5 paraffinized black silk is passed through the conjunctiva approximately 6 mm. behind its nasal border. (Ten-day chromicized catgut does not seem to be so satisfactory.) The

needle is then passed through Tenon's capsule, into Tenon's space. A purse-string suture is placed within Tenon's capsule, care being taken not to overlap the edge. Four-millimeter bites of Tenon's capsule are taken with 2-mm. intervals between bites at the level of the insertion of the recti muscles, in an endeavor to include the cut ends of the recti in the bites (fig. 2). After the circle has been completed, the suture having been brought back to its point of entry, one bite is taken about 2 mm. to the other side of the entrance of the original suture, thus crossing the ends. The needle is then passed through the conjunctiva approximately 3 mm. from the entrance of the original suture. By means of Carter's introducer the sphere is inserted into Tenon's capsule, after which the purse-string suture is drawn taut and the two needles are passed through a small piece of rubber tubing which has been cut in half. When the surgeon is certain that the sphere is completely covered, the ends of the sutures are tied (fig. 3).

When the foreign substance has been properly placed in Tenon's capsule, traction is made upon the sutures and counter pressure on the piece of rubber tubing. Caution is necessary in order that no part of the gold ball may be visible and that the sutures draw Tenon's capsule and the tendons of the recti muscles firmly together. The ends of the sutures are then knotted over the rubber tubing and the conjunctiva is closed by interrupted sutures, placed vertically or horizontally, depending upon the presence of deformities of the conjunctiva or eyelid (fig. 3). If it seems desirable to increase the vertical diameter, the suture line is placed vertically. Two minims of a 1:2500 solution of metaphen is instilled into the conjunctival culdesac, 1:2500 metaphen ointment is applied to the eyelid borders, and a small piece of gauze placed over this. Large pads of gauze are then applied, firm pressure being obtained by successive layers of one-inch adhesive plaster. Finally, the dressing is covered with a tight compressing bandage.

Recently, Guist's decalcified bone spheres* have been implanted. These may be obtained in various sizes, and may be introduced into Tenon's capsule three minutes after they have been sterilized by holding them in a metal basket over an alcohol flame. The advantage of the bone spheres over gold or glass spheres is that once they have been placed they do not become displaced; the bone spheres are also cheaper. Difficulty in sterilizing the spheres has recently been experienced by some surgeons and I prefer a gold ball. The sterilization and manipulation of Guist bone spheres have been described by Allen.[5]

After-treatment. The dressings are not removed for three days, provided they seem to be exerting sufficient pressure, and at that time 1:2500 metaphen ointment is applied. A pressure dressing is again applied with adhesive strips but the bandage is omitted. The deep sutures are removed on the fifth day.

Advantages of this Operation. 1. The technique is simple, and there are no sutures in the operative field during the enucleation of the eyeball. 2. No suture material is permanently buried, which lessens the dangers of infection. 3. Since silk is used, the closure of Tenon's capsule is likely to be more complete and more easily accomplished than with catgut.

Conclusion

This technique has been used in more than forty-five enucleation operations and postoperative loss of the implanted foreign substances has been less frequent than when catgut sutures were buried. The gold ball has been expelled in only two cases.

35 East Seventieth Street.

* V. Mueller and Company, Chicago, Illinois.

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A NEW DIATHERMY POINT FOR RETINAL DETACHMENT*

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In the summer of 1935 Ramon Castroviejo brought from Spain the Electrodiafaco instrument of Julio L. Lacarrère of Madrid. He demonstrated the use of this instrument in operations for detachment of the retina and graciously presented an instrument to the Institute of Ophthalmology. It was used with the diathermy apparatus of Clifford Walker employed at the time with the Walker pins, as well as the apparatus of the Burdick Manufacturing Company, and that of The High Tension Corporation.

The use of the Lacarrère handle has been more recently described by H. Arruga ("Detachment of the retina," translated by R. Castroviejo, Barcelona, 1936, page 100), and M. Khalil (Brit. Jour. Ophth., 1936, v. 20, March, page 174).

The facility with which this instrument could be used and the relatively short operative time required, seemed to make this technique extremely desirable, particularly in view of the fact that the operative results compared favorably with those of other methods of treating detachment of the retina. This led to the adoption of this operation by most of the surgeons at the Institute.

While the principle of the Lacarrère instrument was much appreciated, it became apparent that there were several mechanical features which could be advantageously modified for this type of operation. The instrument having been originally designed for lens extraction, it seemed unnecessarily complicated and delicate for treating retinal detachment, and lacked some features which would improve the operative technique.

With these ideas in mind we set about the design of a new instrument which, as here described, was developed in the Instrument Shop of the Institute.

This instrument includes the perforating point, handle, and cord for attaching to any diathermy apparatus. The handle is made of heavy bakelite and is sufficiently large to offer a firm grip and facility of manipulation. The perforating point consists of a fine steel wire which is supported in a glass capillary tube having a slightly curved tip.

The projection of the perforating point beyond the glass tip, which acts as a gauge or stop, can be regulated so that depth of penetration can be fixed. The technique of using this point is similar to that with the Weve point with the exception that the latter is of a fixed length and requires the insertion of a new point for any change in depth of penetration. It differs from the instruments of Safar

* From the Institute of Ophthalmology of the Presbyterian Hospital.

and Walker, both of which use individual tips that are left in place until the pattern is completed to prevent loss of subretinal fluid.

Reference to the illustration below will indicate the essential parts of the instrument: A is the bakelite handle and A2 the adjusting knob. Rotation of the latter controls the perforating length of the wire tip, one complete turn producing a variation of about 0.8 mm. The knob is also internally threaded at A3 for attachment of the cord, the latter being readily attached to the handle by a few turns.

The bakelite cap, B, screws onto the handle at A4 and serves to grip the glass capillary tube, E, in position by compression of the metal clamp, D. A turn of the cap, B, loosens the glass tube so that the length of the latter may be adjusted with respect to wire and cap. A few turns will release cap, glass tip, and clamp and permit the plunger, C, to be released from the bakelite handle. This disassembly is sufficient for cleaning and sterilization.

The perforating wire, C1, is inserted into the plunger, C, at C3, and fixed by means of a small set screw for which an eyeglass screw driver is required. A lug, C2, engages a slot in the bakelite handle to prevent rotation of the plunger.

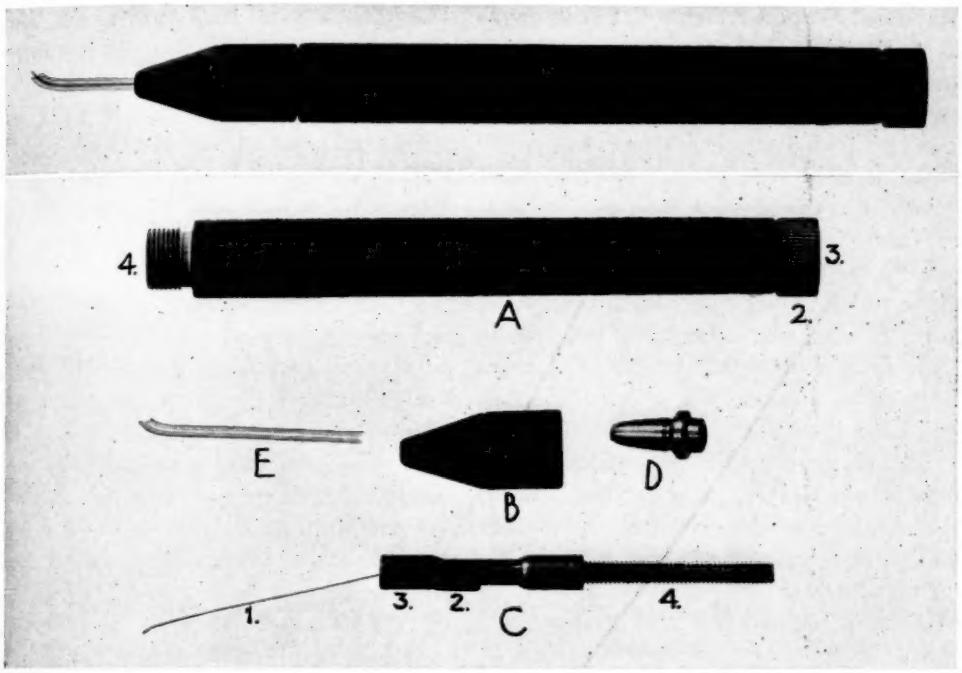


Fig. 1 (Unsworth and Larkin). The diathermy point complete and disassembled for cleaning and sterilization.

The screw, C4, permits adjustment of the entire unit, C, with respect to all other parts, the wire, C1, being movable longitudinally through glass tube, E. When B, D, and E are in position, rotation of the knob, A2, changes the protrusion of the wire point from the glass tip. This adjustment is made at will during the operative procedure, after which it remains fixed until a further adjustment is made. This has a distinct advantage over the Lacarrère handle, which requires con-

stant and precise thumb pressure against a spring.

Since the glass tube tends to pick up serum by capillarity it is advisable to keep the field fairly dry. The bore of the glass tube has been selected after much experimenting: a smaller bore causes the wire to stick, due to coagulated blood, while a larger one does not offer sufficient support to the wire. Extra glass tips and wire points are supplied with the instrument. The glass tips may be used until broken; the wire points need to be replaced only when badly bent or corroded. They do not need to be sharpened, for with proper current the point penetrates the sclera without resistance.

Insulation of the perforating point by the glass tip permits the point to be readily used on posterior portions of the globe; also under the ocular muscles, without requiring their detachment. A strabismus hook or Arruga retractor may be used to separate the sclera from the adjoining tissues.

An intensity up to 300 milliamperes may be used (Arruga, page 100). Since the figures on the milliameter of the diathermy apparatus give only relative approximations of the intensity at the site of application, it is better to estimate the caustic effect of the current by direct observation of the scleral changes. In use with the Walker apparatus we have usually applied a milliameter reading between 40 and 60, though this may be varied under certain conditions.

This instrument has been in constant use at the Institute since March, 1936. Over 50 operations have been performed with it and it is now used almost entirely in operations for retinal detachment. We have found that it possesses the following advantages in this procedure:

1. The steel-wire electrode point can be quickly adjusted to any length from the glass tip by a part turn of the knob. This length then remains constant until a further change is made. The point can be set for a length which just fails of complete penetration of the choroid so that no loss of subretinal fluid occurs until the mosaic is complete. If variations in thickness of sclera and choroid are found, the length of the point may be instantly changed. Then the point is lengthened for complete penetration of the choroid to release subretinal fluid at desired locations. Thus, intraocular tension is maintained during the operation period.

2. The tip may be used at any angle desired by selecting a glass tip of suitable curvature and may be used under obstructing tissues without detaching them, since the point is insulated by the glass tip.

3. The operation may be performed very rapidly, since there are no mechanical parts to be changed during the operation, and the perforating point once fixed requires no further attention.

4. The instrument may be easily disassembled for there are only five detachable parts into which the instrument needs to be divided for complete cleaning and sterilization.

5. The bakelite parts are not affected by immersion in 70-percent alcohol or bichloride solution for half an hour, while glass tip and wire with its plunger may be sterilized in any desired way.

6. The point may be used in connection with any diathermy apparatus offering bipolar current at intensities of 30 milliamperes or over.

7. It is substantial in construction. In the first instrument made, no part, other than the glass tip and wire point, has ever required repair or replacement. Additional glass tubes and wire can be obtained at a few cents each.

635 West One Hundred Sixty-fifth Street.

NOTES, CASES, INSTRUMENTS

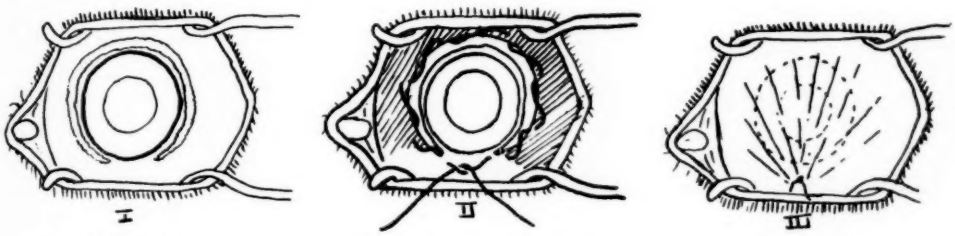
TECHNIQUE ASSOCIATED WITH INTRACAPSULAR CATARACT EXTRACTION*

JOSEPHINE K. DIRION, M.D.
Cleveland

The use of a conjunctival flap in cases of cataract extraction is always a subject for much discussion at any meeting of ophthalmologists. Undoubtedly the reason there are so many types of flaps is because each one is satisfactory only in the hands of its creator.

Since I have confined myself, following my Indian experience, to intracapsular extraction in most patients suffering from senile cataract, I have felt more and more the need for a secure support for the large wound required. I found in some cases a delay in the reestablishment of the anterior chamber which necessitated the patient's remaining in bed longer than if there had been extracapsular extraction with a smaller wound. Rapid union of the wound has many other advantages than the shorter recovery period; advantages such as avoiding a late incarceration of the iris with an associated low-grade iritis and all its related sequelae and a high degree of astigmatism.

Flap technique: A superior-rectus suture is placed to aid in holding the eye down, since a general anesthetic is used. A horseshoe incision is made around the cornea leaving about six millimeters at the lower pole for fixation of the globe during the primary corneal incision. A thin flap is dissected well back all around the cornea, avoiding the subconjunctival tissue. The suture is started in the undissected bridge and carried over and over the margin of the flap, ending about four millimeters from its origin and here the first step of the knot is made and left loose. The flap is pushed back from the cornea and the eye is ready for the corneal incision (which is kept entirely in the cornea) and the lens extraction. Recently I have effected my extractions without an iridectomy, making only a small puncture in the iris with the cataract knife parallel to the corneal wound at the upper pole after the extraction. After the usual toilet of the eye the flap is pulled down and tied over the bridge below where the knot remains fixed in the undissected tissue. The cornea is completely covered by the flap.



Circumcision — Dissection and Suture — Flap tied

Fig. 1 (Dirion). Steps in preparation and closure of conjunctival flap.

The first dressing is done after four days, when the suture is removed. The flap in retracting usually remains adherent to the corneal wound for ten days or two weeks before finally slipping back

* Presented before the Huron Road Hospital staff meeting in February, 1936.

to position. The conjunctiva remains red slightly longer but the security of the flap more than compensates for this. The ultimate scar is a fine white line at the site of the pericorneal incision.

Before developing my own flap, I tried the Kuhnt flap, in which there is a dissection of the upper portion of the conjunctiva, which is held in position by two lateral sutures. Because of the uneven tension created by the position, I discarded it. The Würdemann flap, in which there is a circumcision of the cornea and a purse-string suture tied over the center, offered two difficulties: first, after making the flap there was no means of securing a firm fixation of the globe during the primary incision, and second, a suture tied over the center of the cornea resulted in a central keratitis which took some time to clear.

The anesthetic: Having performed many extractions under local, and several in which a general anesthetic was absolutely necessary under chloroform (at the risk of consequent nausea and vomiting), it was not difficult for Dr. W. H. Phillips to convince me that an anesthetic without preoperative excitement and without postoperative nausea and vomiting would be an ideal procedure for cataract work. Dr. Phillips has used avertin for more than six years with practically all his general anesthetics.

I operated on six patients under evipal and in most instances the anesthesia was quite satisfactory except for the excitement associated with the intravenous administration. Now I have used avertin for a year with very satisfactory results. There is no preoperative excitement, in fact many times the patient is not aware he is being anesthetized, and the twenty-four hours following the operation are quiet and restful. The only contraindication we have found is diabetes, and thus far I still hesitate to use it even with well-guided insulin administration.

835 Rose Building.

ANOTHER TEST FOR MALINGERING

HARRY S. GRADLE, M.D.
Chicago

Any device that can reduce the visual acuity of an eye without detection is of help in unmasking a malingerer who professes marked decrease in the visual acuity of an injured eye. The greater the variety of such devices available the greater the reduction of chances that a malingerer may obtain unjust compensation. If the malingerer is very clever and claims the loss of visual acuity in both eyes, there are a few methods of disproving the claim. But the average malingering patient claims loss of visual acuity only in the injured eye and it is in this type of case that the following test is of value.

In the past, polarization of light has been accomplished by means of a Nicol prism, which is made by cutting Iceland spar along one of the two faces and cementing the two halves together again with Canada balsam. A beam of light transmitted through such a prism progresses in only one plane of vibration. If the beam is then passed through a second Nicol prism whose axis is parallel to that of the first prism, there is no interference. But if the axis of the second prism is at right angles to that of the first prism, the light is completely stopped. Nicol prisms are expensive, clumsy, and unwieldy unless set in some fixed optical instrument. A substitute has recently been developed by the Polaroid Corporation, that from the practical standpoint forms a perfect polarizing element. It is inex-

pensive and can be cut into plates of any desired shape or thickness.

For this test are required three discs of Polaroid, 36 mm. in diameter, and 2 mm. thick. They are held in the ordinary trial frame with the handle corresponding to the polarizing axis. One Polaroid disc is placed before each eye with the polarizing axis horizontal. Before the uninjured eye, the third Polaroid disc is placed with the polarizing axis still horizontal. The patient is then asked to read the smallest possible line of letters on the test chart with both eyes open. Immediately the third Polaroid disc is rotated so that the polarizing axis becomes vertical for the length of time that it takes to read three or four letters. The rotation of the third disc to the vertical position prevents the passage of any light so that if the reading of the test chart is continued during this time, it is very evident that the injured eye is functioning. The discs may be used with correcting spectacles lenses if necessary.

Two points must be kept in mind while making this test: Care must be exercised to see that the injured eye is not closed while the Polaroid discs before the other eye are at right angles. Otherwise the test is valueless. Furthermore, the uninjured eye must be occluded by the opposed Polaroid discs for only a short period at a time so that the patient does not become aware of the momentary elimination of vision in that eye.

Polaroid discs, 2 mm. thick, have a light-green color when the axes are parallel; when the axes approach right angles, the small amount of light that filters through becomes violet. Visual acuity through a disc of this thickness is reduced approximately five percent, which does not interfere with the validity of the test.

58 East Washington Street.

THE USE OF TINTED LENSES IN THE OPERATING ROOM

A. L. Soresi, M.D.
New York

The modern operating room is supplied with very powerful lights to illuminate the operative field. Without entering into a discussion of the effects of the bright light reflected by various objects, it need only be mentioned that such reflections tire the eyes, irritate them, and prevent the perception of the finer details of objects.

In regard to finer perception, tinted lenses will accomplish for the surgeon's eyes the same purpose that filters serve for the lens of the camera. Anyone skeptical about this assertion can easily convince himself of its truth by placing a piece of light-yellow celluloid or light-yellow sun glasses before the eyes.

There is an ideal filter for every type of light, and surgeons can find the ideal filter for their personal use by consulting their eye physicians. The brighter the light reflected on the operative field, the denser must be the filter.

I feel certain that every surgeon will be greatly helped, as I have been, by the use of tinted glasses, both in the perception of details and in the preservation of their eyesight. Ophthalmologists should advise the use of these glasses.

135 East Fifty-Fifth Street.

SOCIETY PROCEEDINGS

EDITED BY DR. H. ROMMEL HILDRETH

LOS ANGELES SOCIETY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY

April 27, 1936

DR. WILLIAM A. BOYCE, *president*

ESSENTIAL PROGRESSIVE ATROPHY OF THE IRIS

DR. G. P. LANDEGGER demonstrated a 27-year-old woman with essential progressive atrophy of the iris in the right eye. The pupil was drawn to one side and had the appearance of a slit like a cat's eye. The patient had no discomfort whatsoever and did not remember any accident. The left eye was normal. The examination of the right eye revealed a normal conjunctiva and cornea; there were a few pigmented grains to be found on the posterior surface of the cornea. The anterior chamber was of medium depth and clear. There was a rather thick anterior synechia to be seen on the limbus nasally and above. It was this adhesion that drew the pupil to an oval shape which slanted toward the nasal side. The iris was bluish green and had the usual sponge-like appearance except opposite the adhesion, where the stroma was stretched, thinned, and atrophic. No posterior synechiae were present and there was no sign of active inflammation. The lens and vitreous were clear. There was no fundus pathology. Both eyes were soft. The patient had a slight myopic astigmatism and the vision was normal in each eye. The general health was good; the blood Wassermann test negative; the Mantoux test positive for 1/100 mg.

The atrophy of the iris had progressed considerably during the last three-and-a-half years while the patient was under observation. New adhesions formed in the lower iris angle and in spite of all these changes no sign of an active inflammation could be found. The tension, which had been equal in the two eyes when the patient came under observation, had risen within the last five months from 17 to 26 mm. Hg (Schiötz) in the right eye; in the normal left eye it had never exceeded 17 mm.

Although a tension of 26 mm. cannot be regarded as glaucomatous, such a difference in tension between two eyes is most unusual. Knowing from the literature that the final outcome of untreated essential progressive atrophy is absolute glaucoma, the patient was advised to use pilocarpine regularly in order to avoid any further rise in tension as long as possible. A filtrating operation is considered for the future.

The history of this case proves again that the iris atrophy cannot be due to the glaucoma in this peculiar disease, for this iris showed signs of atrophy from the beginning, while the tension did not begin to rise until three years later.

ESSENTIAL PROGRESSIVE ATROPHY OF IRIS

DR. ETTA C. JEANCON made a follow-up report on a case which she had presented to the section in April, 1933. At that time the pupil was drawn down into a small slitlike opening below and nasally. On each side of the pupil were two irregularly oval defects through both stroma and pigment layers of the

iris. Visual fields and optic nerve were still perfect, and vision 6/6 in spite of a progressively increasing tension averaging from 50 to 60 mm. Hg (McLean). In July, 1934, tension reached 80 mm. and the first indication of its effect was noted in a small cut in the lower nasal field. A Lagrange sclerectomy was immediately performed. Tension has remained at 30 mm. with fields, optic nerve, and 6/6 vision unchanged for these two years.

Discussion. Dr. W. H. Roberts from Pasadena stated that he had had a patient sent to him several years ago for enucleation on account of tumor in the eye. A careful examination revealed that the patient had a glaucoma secondary to essential atrophy of the iris.

The importance of vision in education

Dr. Peter L. Spencer (by invitation), Professor of Education, Graduate Division, Claremont Colleges, said that the tendency to attempt to secure an education by reading has accentuated eyesight and vision problems to a degree not anticipated. If we are not enabled to meet these problems more adequately, the present degree of use of printed material will necessarily be reduced.

School tests of vision have been almost exclusively confined to measures of acuity. We are now told that comfortable vision with two eyes is more important than clear vision. This raises the question of more adequate testing by schools of the factors affecting binocular vision.

New devices for measurement and for the developing of various visual functions are being offered by commercial agencies for use in schools. Educators desire to know the validity and reliability of these instruments and the conditions under which they may be used effectively.

Educational practice has been modified and continues to be modified upon the basis of inadequate knowledge of physiological and psychological functions. Educators desire to be rational in their practices, but the separation of the specialized sciences concerned with human behavior makes difficult the utilization of knowledge which should be available to guide educational practice.

For educational studies it seems proper to distinguish between eyesight and vision. Numerous investigations of these functions are being made. They need to be coördinated and given direction to insure significant results. Is it not possible to arrange for a coördination of the efforts of various types of specialists in order that more comprehensive and functional studies of sight and vision may be made?

Harold F. Whalman,
Recorder.

MINNESOTA ACADEMY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY

SECTION ON OPHTHALMOLOGY

April 10, 1936

Dr. H. E. Binger, *president*

Detachment of retina

Dr. E. J. Borgeson (Minneapolis) reported the case of Mr. G. L., aged 42 years, who had a detachment of the retina of the right eye of one month's duration. The detachment extended from the 5- to the 9-o'clock position and from disc to ora serrata, and the tear was near the ora at the 7:30-o'clock position.

On March 7th, the lower temporal quadrant was coagulated with 11 Walker diathermy points in the area

between the external-rectus and inferior-rectus muscles. The center of this coagulated area was punctured with the galvanic cautery needle. Following this the patient was kept in bed for a period of 13 days. On March 20th, when he was dismissed from the hospital, he had a normal visual field except for a peripheral defect of 15 degrees in the upper nasal quadrant. His vision at that time was 20/100 and the entire retina appeared to be reattached. During the following week the vision improved to 20/50 with or without correction of the refractive error.

Visual-field contractions after head injury

Dr. Hendrie W. Grant (St. Paul) said that following head injury, contraction of the visual fields may be due to many causes. Some are purely neurologic, others appear to be psychic, and in still others both factors seem closely related. Contracted visual fields simulating hysteric types in postconcussion syndromes return to normal before cessation of other symptoms and before settlement of the liability. They are explained as due to retinal congestion after vasomotor disturbance or to commotio retinae, causing physiologic block of the light impulse. Visual-field studies and hearing tests with the audiometer are valuable adjuncts in the study of head trauma and the postconcussion syndrome.

Discussion. Dr. F. E. Burch (St. Paul) said that Mr. E. B. had been in an automobile accident about December 10, 1935. He had suffered a severe blow on the left forehead, was unconscious for two-and-a-half days, and bled profusely from the nose but not from either ear. He remained in a hospital three weeks, having continuous headaches and pain in the lower spine; during the first 10 days he had constant nausea and vomiting. The left orbit and lids became greatly swollen and discolored. When the swelling subsided he noticed that he had difficulty in reading. There was no diplopia.

On January 2, 1936, he came for an eye examination, with a definite statement that he could see only half of objects with each eye. His vision was 20/200 and 20/50, and could not be improved. No fundus pathology was present in either eye. Examination of his field of vision showed a bitemporal hemianopsia.

Examination by a neurologist revealed nothing wrong with his cranial nerves excepting the optic nerves. The reflexes were entirely normal and the examination was essentially negative. Mentality and orientation were perfect. Examination of the spinal fluid was negative. X-ray films of the skull showed a well-defined masslike shadow occupying practically two fifths (that is, the anterior and superior portion) of the sphenoid sinus, apparently attached to the roof of the sinus. The free border of the mass was sharply defined. A close examination of X-ray films that had been taken earlier, revealed a fracture through the apex of the left orbit.

On April 6th, the vision had improved to 20/30 and 20/25, but the patient was not able to read small print. Pupillary reactions were typically hemianopic. Correction of a low astigmatic error gave him very slight improvement of vision.

The explanation of the hemianopsia in this case is that it was due to a hematoma involving the sphenoidal sinus and chiasm which has not as yet become absorbed. Whether or not the field defects are permanent is problematic.

They have remained unchanged for four months.

Dr. Grant (in closing) said he wished to report the case of a boy, aged 14 years, who was injured in a football game on October 11, 1935. Unconsciousness continued for a period of three or four hours during which time one or two convulsions occurred. It could not be determined whether the convulsions were generalized or of the Jacksonian type. On regaining consciousness, faulty vision and severe headache were the first symptoms of which he complained. He remained in the hospital for one week and at home for three weeks, practically all of the time in bed.

When first seen on November 11th, he complained of fatigue, headache, and half vision with inability to read. The vision of the right eye was 20/20, left eye 20/20+; the muscle balance was normal. Visual fields showed a right or left hemianopsia with a shrinking above and below of the hemianopic field. The fundi showed a slight swelling of the optic nerves, especially of the left eye.

Spinal-fluid pressure was definitely increased on two occasions. Because of the increased intracranial pressure and swelling of the optic nerves, it was thought a hemorrhage had occurred in a cerebral tumor. An encephalogram made on January 19th at the Mayo Clinic showed no filling defect. Thus there is no explanation for the lesion unless it be a deep vascular lesion.

PRELIMINARY REPORT OF THE ELLIOT TREATMENT IN SINUS DISEASE

DR. FRANK L. BRYANT (Minneapolis) (by invitation) read a paper on this subject.

W. E. Camp,
Secretary.

ST. LOUIS OPHTHALMIC SOCIETY

April 24, 1936

DR. CARL T. EBER, *president*

CORNEAL ULCERS

DR. V. L. JONES read a paper on this subject. A summary of the results in nine cases was given and the conclusion was that the actual cautery was valuable in the control of serpiginous ulcers.

Discussion. Dr. W. E. Shahan said that he had started experimenting with the thermophore 20 years ago. The first series of experiments resulted in failure because the temperature had been too low. The cornea would stand 130°F without any effects while the ulcer would gradually become worse rather than be helped when the temperature was too low. After working with pneumococcus corneal ulcers in rabbits it was found that the best results were obtained by using a temperature of 152 degrees for one minute. This method was then used on human eyes and in 60 cases no eye came to enucleation although some required two of three applications of the thermophore. In some instances the ulcer was associated with dacryocystitis. Dr. Shahan said that he had heard of a number of cases in which this treatment had not been successful but this was because the temperature used had been too low. If the ulcer is very deep it may not be possible for the base of the ulcer to be brought up to an adequate temperature unless the thermophore is raised to 160 degrees before application. He said that the eye can stand 200 degrees without being destroyed. After the thermophore application 2-percent mercurochrome is instilled to prevent possible reinfection.

The second day an infected area may be found extending from the original

ulcer and the patient will be suffering pain. A second application to this area is generally effective. Some surgeons complain of having difficulty in controlling the patient during application. Dr. Shahan said that adequate anesthesia usually prevented this trouble. He used 5-percent cocaine drops applied freely for a period of about 10 minutes and felt that it was best if the patient had little knowledge of what was going to be done.

Dr. John Green said that a retrobulbar injection of novocaine would provide a very excellent anesthesia in these cases.

Dr. William F. Hardy said that in over one third of the cases of serpiginous ulcer there is an associated dacryocystitis which is always a potential cause of these ulcers. By getting rid of the dacryocystitis, one is removing the pneumococcus, which is the most common organism as etiologic agent in this type of ulcer. Unfortunately, there is serum for only type-one pneumococcus and the usual pneumococcus found in these cases is type two or three.

In treating the ulcers themselves, Dr. Hardy said that one effective procedure is paracentesis. The new aqueous formed is rich in antibodies and on theoretical grounds paracentesis should help. A hypopyon in itself is not detrimental. He believes the thermophore to be a useful instrument in the treatment of these ulcers.

Dr. V. L. Jones (in closing) said that he realized from Dr. Shahan's discussion why he had not had better success with the use of the thermophore. One of the difficulties that he had had was from the heating effect on the lid, which made the patient very restless during the treatment.

TUBERCULIN THERAPY IN OCULAR TUBERCULOSIS

DR. M. H. POST read a paper on this subject, published in The Journal of the Tennessee State Medical Assoc. (May, 1936).

Discussion. Dr. W. H. Luedde said that if it is a fact that tubercular lesions are sensitive to certain things, we must keep these things from surrounding our patient. Other focal infections and ultraviolet may cause a reaction in a tubercular lesion. The use of tuberculin is to desensitize the local lesion in the eye but it is not a direct cure of the lesion.

AN AMMONIA BURN TO THE EYE WITH FAILURE OF REGENERATION OF CORNEAL EPITHELIUM

DR. JULIUS GROSS presented a patient with this condition.

Discussion. Dr. R. E. Mason said that chemical burns of the cornea very frequently cause a recurrent erosion of the epithelium. In such a case he kept the eye bandaged from the start. If the epithelium kept coming off he treated the area with 15-percent trichloracetic acid. In some cases a paracentesis was helpful and at times a conjunctival flap was worth while.

H. Rommel Hildreth,
Editor.

LOS ANGELES SOCIETY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY

May 18, 1936

DR. WILLIAM A. BOYCE, *president*

FOLLICULAR CONJUNCTIVITIS (ROUND TABLE DISCUSSION)

DR. FRANK MILLER stated that he regards follicular conjunctivitis as a lymphatism and not an infection. In

his experience many of these cases clear up spontaneously after a certain age. The condition with which it is most frequently confused is trachoma. In his treatment of such conditions Dr. Miller pays particular attention to the treatment of foci of infection. He also prescribes syrup of hydriodic acid and uses very little local treatment.

Dr. Melverton Trainor stated that he regards the condition as an infection, and advocated early expression of the follicles. He feels that in this procedure the bleeding of the conjunctiva itself is of some value. He pointed out the advisability of testing the refraction of such eyes.

Dr. William Boyce concurred with Dr. Miller as to diagnosis and treatment.

Dr. George Brown also advocated particular attention to foci of infection; he uses the silver preparations locally.

Dr. Harry Smith advised the use of quinine bisulphate and stated that in place of expressing the follicles by means of instruments he sometimes uses sandpaper.

Supernormal vision and cognition in a 12-year-old boy

Dr. Cecil Reynolds (by invitation), psychiatrist, presented a normal youngster of 12 years who possessed unusual and unexplainable powers. Dr. Reynolds, as an introduction, stated that he offered no explanation for the phenomena which occurred, but simply presented his case as one which could not be explained on the basis of normal physiology. Under the supervision of several ophthalmologists who examined the preparation of the patient and inspected the blindfolds again afterward, the youngster was prepared in the following manner:

A pair of goggles had been constructed by Dr. Reynolds consisting of three layers of black hard rubber covered over with adhesive tape. These goggles were then strapped over the boy's face with several layers of adhesive tape so that no light could enter. He was then seated in full view of the audience in a large chair before a table and allowed to go into a trance. In about two minutes he snapped into action. Where before he had been a composed and sedate person, he now became very alert and inquired by the motion of his hands to be put to test. He began by spelling out the names of various doctors on an ouija board. He then outlined a number of pictures in a magazine presented to him, tracing the contour of each subject accurately. Upon being asked to pick out the word "treasurer" in a certain column in a newspaper, his head shifted from side to side as if he were scanning the page and reading each line of the column until he came to the word "treasurer," which he pointed out. Questions were written on paper. He scanned the paper and made copies of the questions, but did not answer them inasmuch as they were somewhat enigmatic. At times one of his examiners would interpose either his hand or some object between the covered eyes and the paper at which the boy was looking and in each instance the interposed matter was abruptly pushed aside, as if in anger. He then walked about the room, carefully avoiding objects without any seeming difficulty.

Dr. Reynolds stated that the boy had driven him about on the streets of his neighborhood with his head covered. After the demonstration the boy was allowed to come out of his trance.

When the blindfold was removed his eyes appeared to be sensitive to the light of the room and he rubbed them as if awakening from a sleep and became again his original personality.

PRACTICAL POINTS IN X-RAY LOCALIZATION OF OPAQUE FOREIGN BODIES IN THE EYE WITH A DEMONSTRATION OF A NEW LOCALIZATION MODEL

DR. E. S. BLAINE (by invitation) reviewed the history of ocular-foreign-body localization and demonstrated a model by means of which the position of the foreign body is rapidly and accurately localized on the usual localization chart.

Harold F. Whalman,
Recorder.

CHICAGO OPHTHALMOLOGICAL SOCIETY

May 25, 1936

DR. ROBERT BLUE, *president*

CONCERNING CERTAIN COMMERCIAL ASPECTS OF THE SPECTACLE INDUSTRY

DR. JAMES E. LEBENSOHN read a paper on this subject which was published in the Archives of Ophthalmology (August, 1936).

Discussion. Dr. Robert von der Heydt said that a great change had taken place with reference to the price of first-quality lenses. Thirty-five years ago reputable manufacturers were satisfied with less profit.

Dr. Howard Riordan said that some of the statements made by representatives of the optical houses are misleading, because whether ground lenses or cheaper lenses are placed before the patient's eye, he is not in a position to realize the difference.

Dr. Thomas D. Allen said that while his remarks did not apply particularly to Dr. Lebensohn's paper, it was interesting to know that the opticians of Chicago divide oculists under three headings: those on whose prescriptions no substitution can be made; those on whom substitution can be made if the error is not too gross; and those who accept what is sent to them. The men who check the lenses carefully after the prescription is filled belong in the first class; those who merely make a casual examination are in the second; and those who do not check them at all are in the third class. Opticians are not anxious to regrind lenses, and if an error is made in grinding, it is passed on until it comes to the checker, who notes the name of the oculist and judges accordingly.

Dr. J. E. Lebensohn (closing) said, with reference to the Better Vision Institute, that while it probably follows the higher principles of business ethics, like all business enterprises it will bear watching. The basic idea behind the "better-light better-sight" campaign is to increase electric-lamp sales and consumption; and optometrists are to cooperate in educating their clients along these lines.

With reference to poor lenses, it is true that the eye compensates apparently well for many defects, but this puts just so much more strain on the adaptive mechanism of the eye, and does not argue against the inherent viciousness of these defects.

RETINAL ANGIOSPASM IN TOXEMIA OF PREGNANCY AND HYPERTENSION

DR. ELIAS SELINGER read a paper on this subject which was published in this Journal (Jan., 1937).

Discussion. Dr. Elias Selinger (closing) in reply to Dr. Lebensohn's question as to treatment and prevention of retinal angiospasm in nonhypertensive diseases, said this is not easy to answer. Whenever possible the cause of the spasm should be removed. If this is impossible, symptomatic treatment can be tried. Inhalations of amyl nitrite are of temporary benefit. Large doses of theobromine salicylate can be given over a period of months with gratifying results in some cases. It is interesting to note that some of the cases of embolism of the central retinal artery or one of its branches which have been reported to respond to massage of the eyeball, evacuation of the anterior chamber by paracentesis, or amyl-nitrite inhalations, are cases of spasm of these vessels and the good results ascribed to the therapeutic measures employed are in reality due to cessation of the spasm.

Dr. Moncreiff's question brings out a point that should be emphasized; that is, that spasms of the retinal arteries may be present at certain times only, so that repeated examinations are necessary before one can be certain that they are absent. Dr. Folk would probably find these angiospasms more frequently in toxemia of pregnancy if he studied the entire visible retinal arterial system very carefully. As to the diagnostic significance of tortuosity of the venules in the macular region, their presence should call for a closer examination of the arterial branches, because changes in the latter are of greater diagnostic importance.

He agreed with Dr. Gifford that there is need for a uniform terminology in the classification of hypertensive and sclerotic fundus diseases.

Robert von der Heydt.

NEW ENGLAND OPHTHALMOLOGICAL SOCIETY

April 21, 1936

Dr. James J. Regan, *presiding*

Dacryoadenitis

Dr. Benjamin Sachs presented a 40-year-old Italian man who entered the Infirmary complaining of having had pain in the eyes for four weeks with photophobia and ptosis; no loss of vision. A bilateral enlargement of the lacrimal glands was found, each being about the size of an almond. The eyes were red and dry and there was evidence of an old posterior synechia on the left. The Hinton test was negative and the patient was given potassium iodide. A chest plate showed marked hilus thickening and it was thought that the condition was probably due to tuberculosis.

Tumors of lids and conjunctiva

Dr. Benjamin Sachs presented a 56-year-old man who had been treated for syphilis since 1902. In 1904 he had gonorrhea and in 1917 a diagnosis of pulmonary tuberculosis was made. Examination showed a yellow jellylike mass under the conjunctiva of the left eye without accompanying symptoms. There were other small, nodular swellings involving both lids of both eyes as well as masses in the neck and legs. The patient showed an eosinophilia of six percent. It was thought that this was probably a case of sarcoma of Kaposi, which condition is said to respond well to arsenic and X-ray treatment.

Stellate retinitis

Dr. Benjamin Sachs presented a patient who in May, 1935, showed a small right paracentral scotoma. Last winter the patient developed lagrippe and following this he noticed black spots before his right

eye. In January a swelling of the right disc and a vitreous opacity were noted. The case was followed and the pathology developed to involve the macula and a typical star-shaped figure was demonstrated. The blood pressure, skull plates, and urine were negative.

Ocular paralysis following spinal anesthesia

Dr. James J. Regan presented a girl who, following spinal anesthesia, developed photophobia and limitation of the right eye due to paralysis of the right abducens nerve. Throughout the three months since that time she had gradually improved. There are several examples in the literature of ophthalmoplegia following the administration of spinal anesthesia. Of these, paralysis of the sixth nerve is most common, but the cases usually clear up more quickly than in this case.

The changes that occur in detached retina

Dr. Algernon B. Reese read a paper on this subject which will be published in this Journal.

Trygve Gundersen,
Reporter.

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Author's proofs should be corrected and returned within forty-eight hours to the *manuscript editor.* Twenty-five reprints of each article will be supplied to the author without charge. Additional reprints may be obtained from the printer, the George Banta Publishing Company, 450-458 Ahnaip Street, Menasha, Wisconsin, if ordered at the time proofs are returned. But reprints to contain colored plates must be ordered when the article is accepted.

CURES FOR RETINITIS PIGMENTOSA

What is the status of cervical sympathectomy as a treatment for retinitis pigmentosa?

Whenever, in the course of one or two generations, a great number of remedies have been proposed, tried, and abandoned one after the other as cures for a disease which has therefore come to be regarded as incurable, there is ample justification for skepticism as to the chances of success of any new therapeutic proposal. Above all is such skepticism justified with regard to a disorder which has been included in the group of defects to which Treacher Collins and others have applied the name "abiotrophy"; that is, defects whose development was predetermined by some failure in the hereditary genes.

Karsch has recently prepared a critical review of attempts at therapeutic control of retinitis pigmentosa, as disclosed in the literature of ophthalmology between 1877 and 1935 (Zeitschrift für Augenheilkunde, 1936, volume 90, page 157). It is of interest to note that preparation of the review was apparently stimulated to some extent by the German Nationalist law providing for sterilization, in order to prevent transmission of hereditary diseases to future generations.

The long list of remedies which have been resorted to for this purpose is classified by Karsch under the headings of (1) general treatment, vascular measures; (2) special applications to the eye; (3) surgical treatment; (4) radiotherapy;

(5) hormone and vitamin treatments.

Since narrowing of the retinal blood vessels is a striking feature of the disease, vasodilators have been widely employed. Thus, Mellinger reported improvement from sweating. Especially before the Wassermann era antisyphilitic measures were credited with successful results. Strychnine, amyl nitrite, subconjunctival injections of sodium chloride, and retrobulbar injections of atropine may all be reckoned in the class of treatments aimed at improvement in retinal circulation. Mayou and Wheeler are mentioned among those who used the Elliot trephine operation for the same purpose.

Sgrosso's claims of material improvement of visual acuity after Roentgen radiation have been supported by a number of Japanese writers, especially Suganuma, who thought he obtained improvement in eight out of fifteen cases which were systematically subjected to this treatment.

In view of the unquestionable influence of vitamins upon other conditions in which the dark adaptation of the retina is affected, it is by no means surprising that vitamin treatment should have been suggested for retinitis pigmentosa. In a series of cases Doyne administered raw retina of oxen and sheep. Clegg tried a glycerin emulsion of sheep retina, without result. Seggel combined injections of strychnine with the use of cod-liver oil and liver.

Starting from the observation that retinitis pigmentosa is more frequent in men than in women, whereas the published genealogies of retinitis pigmentosa do not suggest that the disease is sex-linked, Wibaut believes that the female organism is particularly rich in hormones which have a favorable influence upon the degenerative process. He, and others with him, have therefore employed a hormonic preparation (menformon). But this line of treatment has led to very few claims of success.

The assumption that retinitis pigmentosa depends upon degeneration of the retinal vessels induced Royle to propose resection of the sympathetic nerve trunk, in order to produce permanent dilatation of the vessels. In five cases, in which he divided the sympathetic above the second thoracic ganglion, he reported improvement of visual acuity and of the visual field. In the six years which have elapsed since Royle's preliminary report in the Medical Journal of Australia, this treatment has been extensively tried in various countries.

There has been some argument as to which part of the sympathetic trunk is best adapted to the purpose. Campbell and Meighen removed the superior cervical ganglion. Magitot stripped the carotid artery of its periarterial plexus. Others have done a cervicodorsal sympathectomy.

Takats and Gifford (Archives of Ophthalmology, 1935, volume 14, page 441) take exception to Royle's method on the grounds that mere section of the sympathetic trunk is rapidly followed by regeneration, that it denervates the upper extremity, and that the preganglionic fibers to the eye may escape division unless the stellate ganglion is removed. In their eleven operations on six patients, they used cervicodorsal sympathectomy four times and superior cervical sympathectomy seven times.

These authors point out that there has been a good deal of discussion as to the permanency of vasodilatation following sympathectomy; and that vascular tonus is regained within a few weeks, although the possibility of a permanently increased supply of blood to the part cannot be ruled out. They evidently feel considerable doubt as to the success of this line of treatment.

Several authors feel that there is little prospect of success from sympathectomy

in the late stages of retinitis pigmentosa. In the early stages of the disease, on the other hand, its development is usualy very slow, and yet the visual condition fluctuates appreciably from time to time. Young patients who still possess fairly good vision, and who are honestly advised as to the extreme uncertainty of beneficial results and also as to the unpleasant disturbances which commonly follow sympathectomy, are hardly likely to show enthusiasm for the experiment. Conscientious surgeons, too, may properly feel a good deal of reluctance to expose patients to these inconveniences in the earlier stages.

It seems at least possible that some of the favorable results reported have depended partly upon an excess of credulity in the patient or even in the surgeon, and partly upon natural fluctuations in the patient's condition. It is a suggestive fact that after unilateral sympathectomy improvement has been reported as to both eyes. One patient showed no increase in visual field or acuity, but "believed" her night blindness had improved.

Walsh and Sloan (Archives of Ophthalmology, 1935, volume 14, page 699) conclude that the merit of the operation is not yet proved, although they would not discard the procedure until further cases have been thoroughly studied. Karsch's review satisfies him that, in view of the unpleasant disturbances produced, the method has not been sufficiently successful to encourage its continuance or further development.

As a general principle, it would be unscientific to argue that failure of previous experiments condemned trial of new measures. To what extent the hazards associated with further experimentation are justifiable is a problem for the surgical conscience. In the presence of substantial risks, it may be questioned whether operations should be urged for the mere purpose of adding to the surgeon's statistical material, especially when the evidence previously accumulated affords no significant prospect of success.

W. H. Crisp.

GRADUATE STUDY

The need for a physician to continue to study so long as he continues in practice, is being more widely recognized every year. The Research Study Club of Los Angeles met for its Sixth Annual Mid-Winter Course on Ophthalmology and Otolaryngology, January 18th to 29th; and the American Board of Ophthalmology held an examination in the Los Angeles County Hospital, on Saturday, January 23d. The registration for the Course was over two hundred, and about thirty took the examination for the Certificate of the Board.

This year the foreign guest-teacher was Felix R. Nager, Professor of Otolaryngology in the Medical School of the University of Zürich, Switzerland. He proved to be a good teacher, with a broad view of his subject, of general pathology, and of the public responsibility of a medical man, whatever branch of medicine he may practice.

In ophthalmology the principal course was given by Dr. Meyer Wiener, of St. Louis. He gave about twenty lectures on "The surgery of the eye." Beginning with the preparation of the patient, he discussed the details of operations, from those for cataract to those on the lids and lacrimal passages. He amply sustained his reputation as a skillful teacher. These courses were well illustrated, largely by lantern slides and drawings on an illuminated background.

There were also valuable lectures by Dr. Frederick C. Cordes, Professor of Ophthalmology in the Medical School of the University of California, San Francisco, on the "Histopathology of the eye"

and "Recent phases of ocular therapeutics," and by the writer on "Applied physiologic optics." In addition to these instruction courses were given each day to groups of the class. Those on ophthalmology were on "Immunology of the ocular tissues," by H. F. Whalman; "Pathology of the eye," by M. N. Beigelman; "Problems of refraction," by F. C. Cordes; "The eye muscles," by J. P. Lordan; "Sliplamp microscopy," by J. G. Kinney. "Anatomical studies, with specimens," by P. S. McKibben and W. J. Mellinger, were of interest to both groups. The discussion luncheons, devoted to answering questions from members of the class, were held each day and were found both interesting and instructive.

The lectures were listed as didactic but were generally illustrated by outlines of clinical cases and lantern slides, showing pictures of patients, histopathology of cases, instruments, methods of treatment, and results attained. Even in general surgery it has been learned that "dry clinics" can be made more broadly instructive than clinic operations. In ophthalmology it has always been true that only a few could see the exact clinical conditions and operative technique.

These mid-winter courses have always been well attended, by those who were practicing in the Pacific Coast States; but there have been some from all parts of the Rocky Mountain region. This year there were men from Canada, Pennsylvania, Ohio, Michigan, Minnesota, Indiana, Illinois, and one from India. The demand for such courses has now led to their establishment in all parts of the country. Often they are given in medical schools; but everywhere they rest on the support of the members of the medical profession who recognize that the rapid spread of scientific knowledge demands that they continue to be students.

Edward Jackson.

EPIDEMIC KERATOCONJUNCTIVITIS DIVERSIFORMIS

H. G. Merrill reported a series of cases of follicular conjunctivitis in the American Journal of Ophthalmology for November, 1936, page 137, under the title of "Epidemic keratoconjunctivitis diversiformis." He believed this condition to be similar to an epidemic described by Colonel Wright as occurring in India between 1928 and 1934. In Colonel Wright's clinic more than 1200 cases were seen. Dr. Merrill stated that he was seeing from one to eight cases daily, the numbers being slightly on the increase. Patients had consulted him especially from Idaho, Utah, California, and Nevada.

Because of the lack of serious consequences, little attention has been paid to the disease and few comments have been received relative to the report. Major C. E. Rice, Surgeon, U.S.P.H.S., sent the editor a report from Dr. Louis A. Packard of Bakersfield, California, which was enclosed with an abstract of Dr. Merrill's paper. Dr. Packard submitted records from a study made in Bakersfield during the summer of 1930. In the spring of that year he had found a rapidly increasing number of cases such as those described by Wright and Merrill. Some of these quickly became severe, resembling mild trachoma. The absence of symptoms was noteworthy. A check of 5000 grammar-school children in Bakersfield during the summer of 1930 revealed that more than 70 percent of these children were estimated to be affected and 3544 of them attended a clinic established for their treatment. Dr. Packard saw from 10 to 20 cases each day in his office. In September of the same year, 1437 cases of the milder form were noted at the time of the opening of school.

Few ophthalmologists apparently have observed the condition, although similar epidemics were noted in Imperial and

Kern counties. The condition has persisted in Bakersfield, but much lessened in degree. Well-nourished children are affected as frequently as the malnourished.

Major Rice in commenting on these two reports in the Health Officer for January states that from descriptions the disease apparently resembles inclusion-body conjunctivitis, and an attempt to differentiate the two diseases should be made.

The possibility that they are really the same disease is one that should be carefully considered, especially as Dr. Merrill has mentioned the presence of some sort of inclusion body.

Although the disease is apparently a mild one, the reports cited indicate that it is very wide spread and extremely prevalent in the affected regions. It certainly would be well for ophthalmologists to be on the lookout for it in order that the necessary steps may be taken for combating its spread. The general acceptance in the last few years of the idea that a virus is the cause of trachoma and of inclusion-body conjunctivitis has awakened interest in the possibility that a virus may cause other ophthalmological inflammations. Much further work is necessary to determine the exact nature of these viruses and their relationships one to another. The small amount of virus material available from trachoma and inclusion-body conjunctivitis has handicapped their study very greatly. It is possible that this epidemic of follicular conjunctivitis might offer possibilities of more prolific investigations along these lines.

Lawrence T. Post.

BOOK NOTICES

WILLS HOSPITAL EYE MANUAL FOR NURSES. By Gladys Elaine Cole, R.N. Cloth binding, 202 pages, 97 illustrations, price $1.75. Philadelphia and London, W. B. Saunders Company.

This short book is a brief abstract of ophthalmic material, exceedingly well adapted to the purpose for which it is intended. The information, especially applicable for nurses, is good and important. The abstract of the general subject of ophthalmology is well chosen and adequate for the nurse. The book should be available in every nurses' training school and should be owned by any nurse who handles ophthalmic cases. The illustrations are numerous and well selected.

The criticisms are minor ones: More complete discussion as to the care of droppers; e.g., the impropriety of merely boiling used droppers without first cleaning them might be elaborated, as mere boiling will not eliminate the possible effects of such drugs as atropine. Also some discussion as to the desirable type of droppers and medicine bottles might be included. Suggestions as to the method of application of drops intended for intraocular absorption might be given. There is a question of the accuracy of the statement that cocaine and euphthalmine do not cause some loss of accommodation, and the failure to mention strong solutions of adrenalin in the group producing mydriasis without cycloplegic effect is worth noting. It seems to the reviewer that directions for the use of scopolamine hydrobromide should be qualified by some instruction as to its particular toxic action. In the paragraph on homatropine hydrobromide for refraction the frequency of its application is mentioned and the strength of the solution but not the number of instillations.

Only one method of turning the upper eyelid is given and this method does not permit the holding of the dropper at the same time. Inasmuch as the application of drops is an important part of the nurse's duty it would seem that she should be instructed in several methods.

The use of the little finger of the right hand, instead of an applicator, for downward pressure on the lids, so that the dropper can be held between thumb and forefinger of this hand, is worth mentioning, as well as the advisability of never inverting the dropper because the flakes frequently present in a new bulb, if introduced into the eye, will sometimes cause irritation.

These very minor criticisms occupy more space than the praise but in reality are quite trivial. They merely constitute suggestions for the second edition.

Lawrence T. Post.

THE OCULAR FINDINGS IN THEIR DIAGNOSTIC AND DIFFERENTIAL DIAGNOSTIC SIGNIFICANCE IN TABES DORSALIS, CEREBROSPINAL LUES, AND MULTIPLE SCLEROSIS. By Carl Behr. Paper covers, 60 pages, 14 plates containing 26 illustrations in monochrome. Supplement No. 21 to the Zeitschrift für Augenheilkunde, Berlin, S. Karger, 1936. Price M. 7.60.

From the pen of this most distinguished authority and teacher in ocular neurology comes a clear, pertinent description of the fundamental processes involved in several important neurological diseases. The accurate, simple details afford most valuable information to the clinician. The translation *in toto* could not but be gratefully welcomed by all eye and nerve specialists of this country.

Especially in the early stages of tabes dorsalis, cerebrospinal lues, and multiple sclerosis do such characteristic ocular changes for each of these three somewhat similar diseases usually appear, as to make possible a differential diagnosis of the underlying condition. In two places in the brain can the visual pathway be involved in a single lesion with both the sensory and motor tracts from and to the extremities: one in the internal capsule and the other in the cerebral peduncle or midbrain. The presence of a homonymous hemianopsia together with hemiplegia and hemianesthesia would indicate that the lesion is located in one of these two positions. If, in addition, there occurs a considerable difference in the size of the pupils with the wider pupil on the side of the visual-field defect associated with a corresponding hemianopic loss of pupillary reflex, then the location of the lesion in the cerebral peduncle or base of the brain is definitely indicated. The homonymous hemianopsia in the latter case is usually accompanied by bilateral optic atrophy of mild degree in which the pallor of the papilla tends to lie more pronouncedly in the eye with the greater defect of the visual field. The absence of the changes in the pupil and in the papilla indicates a focus in the internal capsule.

In uncomplicated tabes dorsalis, a primary involvement of the central visual pathway does not occur from the chiasm centralward. In multiple sclerosis, one frequently meets anatomically sclerotic foci in the chiasm and optic tract; these, however, tend only quite rarely to produce clinical manifestations. Consequently, the above method of differential diagnosis applies only to cerebral lues. In the latter, lesions of the internal capsule are chiefly due to syphilitic changes in the vessel walls or to gummae, while involvements in the cerebral peduncle or base of the brain are generally caused by an extension of a syphilitic meningitis. The latter are therapeutically accessible.

Much more important for the differential diagnosis between tabes dorsalis, cerebral lues, and multiple sclerosis are diseases of the optic nerve. In tabes the degeneration of the optic-nerve fibers begins exclusively in the septa-containing, or intraorbital, part of the optic nerve.

The primary histologic change is a degeneration of the processes of the glial cells interfering with the transfer of nourishment from the blood vessels in the connective-tissue septa to the optic-nerve fibers. For more than eight years, the author has employed intracutaneous injections of the smallest amounts of a foreign protein (tuberculin or peptone) in the treatment of tabetic optic atrophy. He has obtained the definite impression that through this treatment the process in the optic nerve is at least considerably retarded if not brought to a standstill for a long time.

In cerebrospinal lues the optic nerve, chiasm, optic tract, and the motor-sensory nerves of the eye may be involved in a syphilitic meningitis at the base of the brain. A luetic process in the blood vessels of the visual pathway without an associated meningitis has never been found by anatomic examination. The meningitis causes a perineuritis of the ocular nerves as the first stage of the disease. In the case of the optic nerves, chiasm, and tracts, the pia mater is early involved. From the periphery of the optic nerve the luetic process extends along the perivascular connective-tissue septa into the nerve's interior. As the second stage of the process, a peripheral interstitial neuritis develops. Clinically, it may be difficult to differentiate the case from tabes. In both cases there develop in the visual fields concentric contractions or sector defects extending from the periphery, and ophthalmoscopically the picture of simple atrophy is seen. Quite characteristic is the occurrence of a central scotoma, either isolated or associated with a peripheral contraction. In these cases of cerebrospinal lues, the inflammation is generally located in the anterior part of the intraorbital division of the optic nerve and is then not infrequently accompanied by inflammatory or edematous changes in the papilla. Disturbances in function of the nerve fibers and their subsequent degeneration are frequently produced either through the pressure of a massive inflammatory infiltrate in the nerve tissue or as the result of interference with the conveyance of nutriment from the blood vessels. In the brain and in the optic tracts where connective-tissue septa are absent, a perivasculitis prevents the nerve tissue's being nourished adequately. The chiasm is affected alone or more intensively because of its immersion in the infected fluid of the chiasmatic cisterna. The chiasma syndrome consisting of a bitemporal hemianopsia together with a simple optic atrophy is most frequently caused, excepting only tumors of the hypophysis, by a basal lues.

In multiple sclerosis, the primary sudden cellular and fluid exudation into the optic nerve produces a considerable increase in the pressure of the nerve tissue. Because of the presence of the connective-tissue septa in the optic nerve, this pressure cannot be adjusted, for it is above the chiasm by an expansion of tissue. As a result, the constriction by the septa of the inflamed nerve-fiber bundles with their very highly increased tissue pressure leads not only to a functional but also to an anatomic loss of many axis cylinders. In this manner the atrophic discoloration of the papilla develops from the descending degeneration of destroyed axis cylinders. The presence of isolated central scotomata in multiple sclerosis is due to lesions in the axial part of the intracerebral division of the optic nerve, where nutrition is scanty because of the absence of connective-tissue septa. Relative scotomata predominate in frequency. The author emphasizes that a patient with acute retrobulbar optic neuritis needs to be confined to bed.

The involvement in lues of single muscles innervated by the oculomotor

nerve is explained by the fact that in the interpeduncular space, the fibers to the separate ocular muscles lie isolated from each other for a short distance before uniting into a circular nerve trunk. At this place, basal-meningeal luetic processes may involve the nerve fibers to a single eye muscle.

The analysis of pupillary reactions with their anatomic bases is particularly instructive. For the Argyll Robertson reaction, Professor Behr postulates a lesion in a neuron interposed in the cerebral peduncle just above each oculomotor nucleus and receiving afferent pupillomotor fibers from both optic tracts. Characteristic for tabes, in fact "synonymous with it" is the lack of both direct and indirect reactions of a pupil to light together with miosis and an increase of the reaction to convergence or accommodation. Without miosis and with a normal convergence reaction, the absence of the reflex to light may be due to tumors of the quadrigeminal lamina or to chronic alcohol poisoning.

Harvey D. Lamb.

SAGGI DI OFTALMOLOGIA, Volume VIII, 1934-1936. Bologna, R. Clinica Oculistica. (See also Abstracts, Jan.-Feb., 1937.)

This imposing volume contains the reprints published in different Journals by the Staff of Prof. Quirino Di Marzio's Ophthalmologic Clinic in Bologna, Italy. It contains 41 reprints of different format and opens with a description of the Clinic, pictures of the different departments and statistics of the number of patients treated there from 1926 to 1934. The papers are all written in Italian except two that were published in German by Dr. Biozzi.

The scope of the papers is very wide and includes the following subjects: Two excellent articles on "Tuberculosis of the eye," with beautiful pictures, many of them in color, one written by Dr. Di-Marzio and the other by Dr. Caramazza; an article on "Detachment of the retina" by the last-mentioned author; an interesting article on "Radiography of the optic canal" by Dr. F. Spinelli; two articles on the "Diagnosis of the chiasmatic lesions due to changes in the internal carotid"; a contribution reporting 4 cases of calcification, and a case of aneurysm of the internal carotid, with a discussion of the ocular symptoms and the pathogenesis, by Dr. Fillipi-Gabardi; a paper on the "Ocular manifestation in the syndrome of the sphenopalatine ganglion" by Dr. G. Biozzi and a case of "Typical coloboma of the macula associated with arachnodactylia" by Dr. P. Duranti. There are many other interesting articles which it would be impossible to mention here.

The purpose of collecting these reprints of the papers of the Staff members of the Clinic is to show all the scientific work done at the Institute; a very valuable practice which could be followed with advantage in other clinics.

M. U. Troncoso.

NOTE

Through an oversight the name of Dr. Derrick T. Vail was omitted as the author of the obituary of Dr. Clarence King on page 83 of the January issue.

ABSTRACT DEPARTMENT

EDITED BY DR. WILLIAM H. CRISP

Abstracts are classified under the divisions listed below, which broadly correspond to those formerly used in the Ophthalmic Year Book. It must be remembered that any given paper may belong to several divisions of ophthalmology, although here it is only mentioned in one. Not all of the headings will necessarily be found in any one issue of the Journal.

CLASSIFICATION

1. General methods of diagnosis
2. Therapeutics and operations
3. Physiologic optics, refraction, and color vision
4. Ocular movements
5. Conjunctiva
6. Cornea and sclera
7. Uveal tract, sympathetic disease, and aqueous humor
8. Glaucoma and ocular tension
9. Crystalline lens
10. Retina and vitreous
11. Optic nerve and toxic amblyopias
12. Visual tracts and centers
13. Eyeball and orbit
14. Eyelids and lacrimal apparatus
15. Tumors
16. Injuries
17. Systemic diseases and parasites
18. Hygiene, sociology, education, history
19. Anatomy, embryology, and comparative ophthalmology

4

OCULAR MOVEMENTS

Greene, M. L. **Case of marked exotropia treated with strong concave lenses.** Amer. Jour. Ophth., 1936, v. 19, Dec., pp. 1106-1108.

Ohm, J. **Nystagmus.** 39th communication. **The significance of attention in latent nystagmus.** Graefe's Arch., 1936, v. 136, p. 229.

Observations on two cases of the energy or frequency amplitude of the nystagmus with the eyes open, with each eye alternately shaded, with vertically placed prisms alternately before each eye, with the room darkened, with the optokinetic reaction with a revolving drum, and with the vestibular turning reaction prove that attention is the significant factor in the occurrence of latent nystagmus. H. D. Lamb.

5

CONJUNCTIVA

Aliquò-Mazzei, A. **Conjunctival tuberculosis.** Boll. d'Ocul., 1936, v. 15, Aug., pp. 820-846.

Shortly after an attack of pleurisy a boy of ten years showed gray ulceration, 10 by 7 mm., at the upper nasal angle of the left conjunctiva. Another boy, aged nine years, with negative general history, showed in the lower palpebral conjunctiva of the right eye diffuse papillary hypertrophy surrounded by an ulcerated margin. In both cases the preauricular, lateral cervical, and submaxillary glands were swollen. Intradermal, histologic, and bacteriologic tests in both cases and pathologic examination in the second were positive for tuberculosis. The writer regards the first case as one of secondary tuberculosis of the conjunctiva of endogenous origin, and the second as one of primary tuberculosis of exogenous origin. (Bibliography, 6 figures.) M. Lombardo.

Attiah, M. A. H. **The clinical aspects of phlyctenular affections in Egypt.** Bull. Ophth. Soc. Egypt, 1935, v. 28, p. 73.

A classification of phlyctenular conjunctivitis into three types is suggested. In the acute type the course of the disease is short, about seven to ten days, and there are generally no complications. In this form there are no tuberculous clinical manifestations. In the subacute type, the phlyctenules are corneal with secondary infection and subsequent ulceration. The chronic type is usually corneal and is accompanied by tuberculous manifestations. Edna M. Reynolds.

Attiah, M. A. H. **Seasonal epidemics of acute Koch-Weeks and gonococcus ophthalmias.** Bull. Ophth. Soc. Egypt, 1935, v. 29, p. 66.

Statistical records of the incidence of Koch-Weeks and gonococcus ophthalmias in Kasr el-Aini Hospital in Cairo over a period of seven years show that Koch-Weeks epidemics are at their maximum in the spring when the temperature is moderate and the air dry. Human carriers are assumed not to exist, since Koch-Weeks organisms cannot remain in the conjunctiva for any length of time after an attack has subsided.

Gonococcus conjunctivitis epidemics are at their maximum in the fall, when the temperature is moderate and the air humid. Human carriers for gonococcus are a great probability because gonococci are found in the conjunctival sacs of persons not suffering from acute ophthalmia.

Excessive heat or cold inhibits the growth of either organism, so that in summer and winter Koch-Weeks and gonococcus ophthalmias are practically nonexistent. Edna M. Reynolds.

Essen-Möller, Lars. **The frequency of phlyctenulosis.** Acta Ophth., 1936, v. 14, pts. 3-4, p. 414.

Analysis of 335 cases relative to frequency of the affection, age, sex, and season of the year shows diminution of incidence and preponderance of recurrences from January to March. Fifty per cent of cases occur under ten, and ninety per cent under twenty-five years of age. The greatest number of cases are found between two and three and between eight and ten years of age. Sixty percent of the patients are girls.
Ray K. Daily.

Jakovleva, A. A. **A familial epidemic of acute catarrhal and membranous conjunctivitis caused by bacillus coli.** Sovietskii Viestnik Opht., 1936, v. 9, pt. 3, p. 354.

A family of five were affected by an acute membranous conjunctivitis caused by bacillus fecalis alcaligenes and bacillus dysenteriae liquefaciens. Only one case failed to respond to copper sulphate, irrigations with cyanide of mercury, and protargol. Recovery was hastened by subcutaneous injections of diphtheria antitoxin.
Ray K. Daily.

Lazarescu, D., and Damian, E. **Calcemia and calcium therapy of so-called eczematous blepharokeratoconjunctivitis.** Klin. M. f. Augenh., 1936, v. 97, Nov., p. 626.

In 74 persons with various eye diseases, mostly with phlyctens, 40 with fully developed eczematous blepharokeratoconjunctivitis, the calcium content of the blood was determined according to the method of Krämer-Tisdall. The calcemia in most cases of eczematous conjunctivitis fluctuated between 83 and 89 mg. per c.c., in the normal between 92.21 and 112 mg. or an average of 100 mg. Hence the authors conclude that in eczematous keratoconjunctivitis a hypocalcemia generally exists in connection with the beginning of the disease and the onset of ocular symptoms. Of these patients, seventeen were treated every 48 hours with intramuscular or intravenous injections of 10 c.c. of a mixture of calcium-gluconate and calcium-thiosulphate. After 48 hours the calcemia was increased in all. The injections were very well tolerated. Not only the acute symptoms (photophobia, blepharospasm, lacrimation, edema of the conjunctiva) receded but the healing of the ocular process was accelerated. The settling time of the erythrocytes, which is augmented in eczematous conjunctivitis, becomes retarded under this treatment. C. Zimmermann.

Lobel, A. **"Trachocid," a new medicament in the treatment of trachoma.** Ann. d'Ocul., 1936, v. 173, Sept., pp. 734-736.

Trachocid is an atoxic and nonirritating combination of immenin of Kretschy and snake venom. It retains the special effect of venom on the reticuloendothelial system and inhibits the proliferation of pathologic cells. Subconjunctival injections of trachocid apparently decrease follicle formation. Brecher has used this preparation in

over 150 cases of trachoma with very encouraging results. Lobel has used it in eight cases with improvement in seven. John C. Long.

Mohamed, I. A. . . . **the incidence of eosinophilia in the conjunctival secretions in Egypt.** Bull. Ophth. Soc. Egypt, 1935, v. 28, p. 57.

In cases representing the average condition of the conjunctiva in Egypt, eosinophilic cells are common, and their occurrence bears no relation to the blood picture. In the actively congested type of trachoma, eosinophiles were found in the secretions more frequently than in healed trachoma. Applications of silver or copper to the conjunctiva were found to cause a marked increase in eosinophiles. In cases of parasitic infection the incidence of eosinophilia of the conjunctival secretion bears no relation to the percentage of eosinophiles in the blood. In the conjunctival smears of these cases eosinophilia occurred in about the same proportion as in non-parasitic cases. Patients with leprosy showed no positive conjunctival smears for eosinophilia except when ocular leprosy was present.

Edna M. Reynolds.

Rameev, P. S. **Complications after expression of trachoma granules.** Sovietskii Viestnik Opht., 1936, v. 9, pt. 2, p. 227.

Because three cases of corneal ulcer with severe damage to vision complicated expression operations for trachoma, the author believes that one eye should be treated at a sitting and that expression should not be performed in the acute stage of the disease.

Ray K. Daily.

Satanowsky, P., and Kurlat, P. **An interesting case of syphilis of the palpebral conjunctiva.** Arch. de Oft. de Buenos Aires, 1936, v. 11, Sept., p. 533.

The case reported, in a woman of 53 years, was unusual in that the lesions were triple, one in the lower retrotarsal fold and two in the upper tarsal conjunctiva. Adenitis and biopsy established its secondary luetic character as well as the appearance of mucous patches three months later on the uvula. There was, however, a history of previous infection four years before, from which the patient is assumed to have recovered under treatment. The mechanism of reïnfection is not clear.

M. Davidson.

Soliman, A. M. **Lipoid infiltration of cornea and conjunctiva.** Bull. Ophth. Soc. Egypt, 1935, v. 28, p. 109. (See Section 6, Cornea and sclera.)

Stiel, Andreas. **Trachoma problems.** Zeit. f. Augenh., 1936, v. 90, Nov., p. 263.

The author feels that his 25 years of study of trachoma problems, preceded by intensive bacteriologic studies, are ready to be presented in summary. He does this in two and one-half pages. The etiologic agent he believes to be a blastomycete. Important factors in pathogenesis are mixed infection and predisposition, but most important is exposure to an extremely dusty atmosphere. Since he has found that iodoform applied as powder or ointment kills the causative blastomycetes and allows the lesion to heal without scars, he considers the therapeutic problem solved. Prophylactic procedures follow obviously. F. Herbert Haessler.

Strebel, J. **Avoidance of danger of shock in etiologic allergic treatment.** Klin. M. f. Augenh., 1936, v. 97, Oct., p. 519.

If shock occurs after injection of a prophylactic preparation during the florid period, that is at the time of pollen production, the specific treatment must at once be discontinued and replaced by symptomatic therapy with ephetonin injections and tablets. In the non-florid period shock is arrested by injection of ephetonin, and prevented by addition of non-synthetic adrenalin.

C. Zimmermann.

Tobgy, A. F. **Histopathology, bacteriology, and treatment of Bitot spots.** Bull. Ophth. Soc. Egypt, 1935, v. 28, p. 79.

Bitot spots are triangular patches on the conjunctiva or cornea which are covered with foam, easily removed but

quickly reproduced. The lacrimal secretion does not adhere to the spots, which appear dry and raised above the conjunctiva. Histologic examination shows a thickened epithelium with keratinized upper layers, and the basal cell layers show fine pigment granules in the protoplasm. No fat cells could be demonstrated. Xerosis bacilli were present in all smears and cultures. The treatment found most satisfactory is cauterization with pure phenol after scraping off the deposits.

Edna M. Reynolds.

Tokareva, B. A. **A rare case of impregnation of the conjunctiva.** Sovietskii Viestnik Opht., 1936, v. 9, pt. 3, p. 326.

Bluish discoloration of the skin and conjunctiva of the lower lid appeared after an expression operation for trachoma. Microscopic section showed extracellular black granules which chemically gave negative reactions for iron, copper, and silver. (Illustrations.)

Ray K. Daily.

Wilson, R. P. **Factors in the seasonal incidence of the acute ophthalmias.** Bull. Ophth. Soc. Egypt, 1935, v. 28, p. 88.

The seasonal variation of Koch-Weeks conjunctivitis is influenced by one climatic factor only, temperature; while that of gonococcal conjunctivitis depends upon two climatic factors, temperature and humidity. When gonococcal conjunctivitis is at its height in September or October and the mean maximum temperature is 31°C.(87.8F.), the relative humidity is 75 percent; but in May, when the mean maximum temperature is also 31°C., the relative humidity is only 52 percent. Koch-Weeks conjunctivitis is at its height in May and there is a secondary increase in the incidence of Koch-Weeks conjunctivitis in October. That flies transmit the ophthalmias has never been experimentally established but is probable, since the two periods of maximum incidence of Koch-Weeks conjunctivitis and the height of the endemic of gonococcal conjunctivitis coincide exactly with the two principal fly-breeding seasons.

Edna M. Reynolds.

Wilson, R. P. **Observations on trachoma stage 1.** Bull. Ophth. Soc. Egypt, 1935, v. 28, p. 82.

Observation of the eyes of infants during a period of five years has proved that it is possible for a child to have a perfectly typical stage 1 trachoma and yet for such signs to clear up without going through stages 2 to 4 and without afterward producing the slightest visible changes in the palpebral conjunctiva. It is not possible, however, for a patient to have stage 1 without showing new vessels in the cornea.

Edna M. Reynolds.

6

CORNEA AND SCLERA

Fisher, F. P., and Ancona, S. **Congenital familial corneal dystrophy.** Acta Ophth., 1936, v. 14, pts. 3-4, p. 406.

Father and two daughters had congenital corneal thickening and opacity with normal tension and with normal endothelium and Descemet's membrane. The opacity and thickening of the cornea are attributed by the author to abnormal permeability of the corneal parenchyma, based on a malformation of the corneal nerves. (Illustrations.)

Ray K. Daily.

Godlevskii, L. B. **Modification of Denig's operation for trachomatous pannus.** Sovietskii Viestnik Opht., 1936, v. 9, pt. 2, p. 236.

Instead of mucous membrane the author implants a piece of skin from the lid into the limbus. The results were satisfactory in thirty cases.

Ray K. Daily.

Grósz, Stephan de. **Etiology and therapy of keratoconjunctivitis sicca.** Klin. M. f. Augenh., 1936, v. 97, Oct., p. 472.

The author discusses the syndrome of Sjögren, as he calls it, consisting of keratoconjunctivitis sicca, xerostomia, and pharyngolaryngitis sicca. It is caused by atrophy or deficient secretion of the corresponding glands, especially the lacrimal gland occurring chiefly in women who during the climacteric years suffer from arthritis. The report of four cases shows that not infection

but disturbance of the hematogenous organs plays the chief part. In two typical cases the author found pernicious anemia. He attributes the affection to a disturbance of vitamin supply. Of the numerous therapeutic possibilities apart from folliculin and injections of ethylcholin, antianemic treatment (liver, iron, and arsenic) and vitamins A, B, C are mentioned, with fibrolysin, and vitamin-A oil locally.

C. Zimmermann.

Kolenko, A. B. **Paracentesis and urotropin in the treatment of corneal ulcers.** Sovietskii Viestnik Opht., 1936, v. 9, pt. 2, p. 100.

Thirty cases of severe corneal ulcers resistant to the usual therapeutic procedures were treated with paracentesis of the anterior chamber and intravenous injections of urotropin, with very satisfactory results.

Ray K. Daily.

Krachmalnikov, L. L. **Comments on the operation which I proposed in 1930 for trachomatous pannus.** Sovietskii Viestnik Opht., 1936, v. 9, pt. 3, p. 361.

A conjunctival incision is made 4 mm. above the limbus, the episcleral tissue is curetted, and the incision is closed with a continuous catgut suture. The cicatrix, the author claims, serves to obliterate the superficial and deep bloodvessels, acts as a barrier to spread of the infection, and holds the upper lid away from the cornea.

Ray K. Daily.

Nagy, Alexander. **Corneal ulcers after certain injuries in preglaucomatous eyes.** Klin. M. f. Augenh., 1936, v. 97, Oct., p. 523.

Three cases of protracted healing of corneal ulcers in eyes of glaucomatous predisposition were finally cured by posterior sclerotomy. In corneal ulcers of older persons one must be very conservative as to ordering mydriatics. In the presence of predisposition to glaucoma posterior sclerotomy should be performed as early as possible.

C. Zimmermann.

Pao-Hua, Liu. **A report of twelve cases of keratitis filamentosa.** Chinese Med. Jour., 1936, v. 50, Nov., pp. 1653-1655.

The twelve cases are recited almost without comment. Nearly all the causes stated in the literature were possibly represented in these cases. The author has not encountered a case which appeared to be connected with arthritis deformans. The treatment, in addition to eliminating the primary cause, is to scrape off the filaments with swabs; and instillation of one-percent zinc-sulphate solution is helpful. In cases resulting from extirpation of the lacrimal gland, instillation of physiologic saline solution should be commenced as soon as the first sign of lack of lacrimation appears.

W. H. Crisp.

Soliman, A. M. **Lipoid infiltration of cornea and conjunctiva.** Bull. Ophth. Soc. Egypt, 1935, v. 28, p. 109.

A case of lipoid infiltration of the cornea and conjunctiva in a boy aged fourteen years is reported. The palpebral conjunctiva was inlaid with a network of yellow masses and the bulbar conjunctiva showed avascular white masses which moved freely with the conjunctiva. Near the limbus the opacities took a linear form and invaded the cornea. Slitlamp examination showed deposits at all levels of the substantia propria of the cornea. Spaces resembling water clefts in cataract were seen in the anterior third of the cornea. They were probably cholesterin crystal spaces. In the right cornea, which was least affected, granular whitish deposits were seen along the blood vessels in the cornea, especially at their bifurcations.

Examination of biopsy sections showed lesions characteristic of trachoma, and lipoid masses that stained with Sudan III in the superficial layers of the cornea and in the conjunctiva. Under the polarizing microscope it was found that the chief bulk of these lipoids was cholesterin. The patient was anemic and stunted in growth, from helminthic infection. The fact that the lipoid masses were deposited along the vessels in the less affected eye suggests very strongly that they were carried to their destination by the blood vessels.

Edna M. Reynolds.

Soliman, A. M. **Trachomatous interstitial keratitis.** Bull. Ophth. Soc. Egypt, 1935, v. 28, p. 112.

Anatomic evidence of trachomatous interstitial keratitis is furnished from a case in which there had been recurrences for six years, resulting finally in perforation of the cornea.

Edna M. Reynolds.

Tobgy, A. F. **Keratitis epithelialis vernalis.** Bull. Ophth. Soc. of Egypt, 1935, v. 28, p. 104.

The involvement of the cornea in spring catarrh is found to be much more frequent than generally supposed. The lesions are limited to the epithelial layer. In the benign form, the excrescences in the bulbar conjunctiva extend slightly on to the cornea and may resemble arcus juvenilis, trachomatous pannus, or sclerosing keratitis. In the malignant form, which is very rare, the limbal excrescences may cover a great part of the cornea and interfere with visual acuity. Such excrescences are obstinate to surgical treatment, owing to their hyperplastic nature. Under the slitlamp, direct illumination shows a fine granular appearance. By retro-illumination, these granules give the appearance of epithelial bedewing. The corneal surface shows fine irregularities due to desquamation. The definite ciliary injection together with round-cell infiltration points to the inflammatory character of the affection.

Edna M. Reynolds.

Tretiakov, I. M. **Keratitis rosacea.** Sovietskii Viestnik Opht., 1936, v. 9, pt. 3, p. 358.

A report of a case with a vascularized corneal opacity, moderate inflammatory symptoms, and reduced corneal sensitivity. Under diet, autohemotherapy, and zinc-ichthyol salve, the eye recovered with 0.06 vision.

Ray K. Daily.

Volkova, A. A. **Gumma of the cornea.** Sovietskii Viestnik Opht., 1936, v. 9, pt. 3, p. 351.

In one of two cases complicating parenchymatous keratitis the process was controlled with antiluetic treatment and in the second the cornea was destroyed in spite of such treatment.

Ray K. Daily.

7

UVEAL TRACT, SYMPATHETIC DISEASE AND AQUEOUS HUMOR

Berens, C., Nilson, E. L., and Chapman, G. H. **Iritis produced in rabbits' eyes by the intravenous injection of crude and purified cultures of bacteria isolated from patients with certain inflammatory eye diseases.** Amer. Jour. Ophth., 1936, v. 19, Dec., pp. 1960-1069.

Birich, T. **The genesis of osseous tissue in the eye.** Sovietskii Viestnik Opht., 1936, v. 9, pt. 3, p. 332.

Osseous tissue may form not only in atrophic eyes, but also in eyes with chronic inflammatory processes accompanied by formation of connective tissue cicatrices. Its formation may prolong the chronic inflammatory process and give rise to sympathetic ophthalmia. Microscopic study of an eyeball enucleated for chronic glaucoma shows that the osseous tissue is formed through metaplasia of the organized exudate, and does not originate in the uveal tract. Ray K. Daily.

Grolman, G. von. **Ossified choroid.** Arch. de Oft. de Buenos Aires, 1936, v. 11, Sept., p. 545.

A case of unusually extensive ossification of the choroid encountered in the enucleation of a degenerated eye, lost from blennorrhea neonatorum, in a woman of 25 years, is reported and illustrated. M. Davidson.

Jaeger, Ernst. **Unilateral immobility of the pupil.** Klin. M. f. Augenh., 1936, v. 97, Nov., p. 658.

Seven cases, in young persons, of incomplete absolute unilateral immobility of the pupil, with preservation of the accommodative reaction and not quite maximal mydriasis, were attributed to a nuclear lesion of unknown etiology.

C. Zimmermann.

Katznelson, A. B. **Tuberculous panophthalmitis.** Sovietskii Viestnik Opht., 1936, v. 9, pt. 2, p. 205.

This is the eighth case reported in

the literature. The patient, eighteen years old, with an active pulmonary process, developed a choroiditis which spread and ended in necrosis and perforation of the eyeball.

Ray K. Daily.

Ladekarl, P. M. **Iridocyclitis with anesthesia of the cornea, hypotony, and deep anterior chamber.** Acta Ophth., 1936, v. 14, pts. 3-4, p. 477.

A detailed report of three cases. The author attributes the hypotony and corneal anesthesia to inflammation in the ciliary ganglion. (Illustrated.)

Ray K. Daily.

Malbran, J., and Adroguè, E. **Doyne's choroiditis.** Arch. de Oft. de Buenos Aires, 1936, v. 11, Sept., p. 529.

The case reported was observed in a woman of twenty years, with normal vision, absence of central scotomata and paramacular white dots, but granular appearance of the maculae. No other members of the family were affected. The familial nature of Doyne's choroiditis is therefore doubted. It can be differentiated from Stargaards disease by being almost exclusively confined to females, and from "choroiditis guttata" by larger size of the spots as well as by affinity for females and for the young. M. Davidson.

Riad, M., and Boulgakow, B. **A case of diplocoria in a donkey (Equus Linnaeus).** Bull. Ophth. Soc. Egypt, 1935, v. 28, p. 118.

Slitlamp examination showed the bridge of iris tissue separating the two pupils to be composed of the posterior mesoblastic layer and the retinal pigment layer. Edna M. Reynolds.

Sondermann, R. **Intraocular pressure and vascular pressure in the eye.** Klin. M. f. Augenh., 1936, v. 97, Oct., p. 443.

Sondermann's investigations show the pressure in the choroidal veins to be from 25 to 30 mm. Hg higher than in those of the retina thus the equality in both assumed by Seidel is not correct. Sondermann calls attention to the different anatomic and physical conditions in both systems, which explain their different reactions to intraocular hypertension. In all pathologic processes a favorable circulation and absence of any impediment to the free efflux of the venous blood is the most important basis for healing. Reduction of intraocular pressure is one of the most efficacious therapeutic measures in chronic affections of the uvea. This may be attained with pilocarpine.

C. Zimmermann.

8

GLAUCOMA AND OCULAR TENSION

Abraham, S. V. **Glaucoma in amblyopia.** Amer. Jour. Ophth., 1936, v. 19, Dec., pp. 1094-1096.

Archangelskii, P. F. **Forceps-spatula for Heine's operation.** Sovietskii Viestnik Opht., 1936, v. 9, pt. 2, p. 117. (See Amer. Jour. Ophth., 1937, v. 20, Feb., p. 223.

Bothman, L., and Blaess, M. J. **Results of the surgery of glaucoma.** Amer. Jour. Ophth., 1936, v. 19, Dec., pp. 1072-1084.

Cappetta, D., and Motolese, A. **Juvenile glaucoma.** Boll. d'Ocul., 1936, v. 15, Sept., pp. 911-1002.

Among the 1,225 cases of glaucoma examined in the ophthalmic department of the University of Florence, from 1925 to 1934, were seventeen of juvenile glaucoma. The age of the patients varied from ten to forty years, the latter being the upper limit of age set by the writers. The male sex prevailed over the female in the proportion of twelve to five. Ten eyes were hyperopic, eleven showed low and four high myopia. Fourteen patients were bilaterally affected. The writers consider heredity first as an etiologic factor, and congenital or acquired lues as second. Elliot's trephining was performed on fifteen eyes. Lagrange's sclerectomy on thirteen, and iridectomy on four. (Bibliography, 25 figures.) M. Lombardo.

Casà, Gerolamo. **Ocular alterations in a patient affected by Werlhof's disease.** Boll. d'Ocul., 1936, v. 15, Aug., pp. 871-889.

Detailed description is given of the histologic examination of the right eye

of a woman of 52 years who since girlhood had been affected by a hemorrhagic diathesis of the Werlhof type. The eye was affected by hemorrhagic glaucoma. The writer concludes that the anamnesic, clinical, and histologic findings in these cases show independent genesis of the two pathologic factors—the hypertension and ocular hemorrhage. Local therapy is of no avail in cases of intraocular hemorrhage resulting from constitutional factors. (Bibliography, 4 figures.)

M. Lombardo.

Correa de Barros, Eduardo. **Diathermic d'arsonvalization in ocular hypertension.** Arch. de Oft. de Hisp.-Amer., 1936, v. 36, July, pp. 373-376.

The author advocates diathermy as a means of reducing tension in some eyes with mild glaucoma. He claims to have obtained good results.

Ramon Castroviejo.

Davson, H., Duke-Elder, W. S., and Benham, G. H. **The ionic equilibrium between the aqueous humor and blood plasma of cats.** Biochem. Jour., 1936, v. 30, May, p. 773.

Experimenting on cats, the authors show that so far as Na+, K+ and Cl— ions are concerned, there is a Donnan's equilibrium between the aqueous and the blood plasm. They state that the aqueous is a dialyzate from the blood plasm. In seeking to correlate these findings with the problem of glaucoma, they state that a simple change in the colloid osmotic pressure of the aqueous is not sufficient to produce glaucoma. They conclude that there is no evidence that glaucoma is due to an increase in blood pressure.

Theodore M. Shapira.

Diaz Dominguez, Diego. **An attempt to differentiate clinically the different pathologic mechanisms of ocular hypertension.** Arch. de Oft. Hisp-Amer., 1936, v. 36, June, pp. 281-309.

After a brief review of the different provocative tests for chronic glaucoma, the author describes his method of massaging the eyeball for about five minutes and taking the tension every five minutes for a half hour. In normal eyes the author has found that with his massage test the tension of the eye diminishes rapidly and then returns to normal slowly (normal elimination with normal production of fluids). He has been able to classify the different types of glaucoma following the use of his provocative test in three groups: (1) Glaucomatous eyes in which the tension diminished very little with the use of massage and increased very rapidly afterward (deficient elimination and hypersecretion). (2) Eyes in which the tension diminished very rapidly with massage and increased rapidly afterward (normal elimination and hypersecretion). (3) Glaucomatous eyes in which the tension diminished very little or not at all with massage and did not increase afterward (retention eyes which may have normal elimination and normal secretion of fluids but which have the filtration of the fluids hindered by anterior and posterior synechias). (Bibliography, 8 figures.)

Ramon Castroviejo.

Fahmy, A. Y. **Three operations improved with success (advancement, cyclodialysis, entropion).** Bull. Ophth. Soc. Egypt, 1935, v. 28, p. 29.

For relief of secondary glaucoma is recommended cyclodialysis with incarceration of the iris in the suprachoroidal space, instead of under the conjunctiva.

In advancement operations, the author carries an incision through four-fifths of the thickness of the sclera as if for cyclodialysis and then puts the scleral sutures in with a straight needle. This avoids the curve of the sclera and prevents the possibility of piercing the sclera.

Webster's operation for entropion is modified by placing the graft between the tarsus and the underlying muscle, instead of cutting the muscle.

Edna M. Reynolds.

Kraupa, E. **Staphyloma posticum verum (Graefe).** Zeit. f. Augenh., 1936, v. 90, Nov., p. 276.

Staphyloma posticum verum was first described by Graefe in his famous glaucoma essay in the fifteenth volume of his Archiv, page 173. He considered

it a lesion of glaucoma and not of myopia. L. Weiss, who was unaware of this reference, described the field disturbance and compared it to that of glaucoma but did not draw conclusions as to their identity. Graefe's view can be corroborated by anyone who regularly takes fields and tension in such cases. There is atrophy, not excess, of nerve fibers where they are sharply bent and there is choroidal atrophy which is the glaucomatous halo.

F. Herbert Haessler.

Magitot, A. **Pathologic ocular hypotension.** Ann. d'Ocul., 1936, v. 173, Oct., pp. 785-809.

Ocular tension is modified by the local circulation, circulating substances in the blood, and nervous factors. Certain cases of hypotension may be due to congenital malformations such as extensive colobomas or (rarely) to familial myopia. Tension may be abnormally low following trauma, especially to the ciliary body and limbus. Detachment of the choroid is often associated with hypotension. Low tension is the rule in retinal detachment. Some hormonal influence may be responsible for the hypotony found in generalized infections and toxemias. Various nervous disorders, especially herpes zoster, produce abnormally low intraocular tension. John C. Long.

Nagy, Alexander. **Corneal ulcers after certain injuries in preglaucomatous eyes.** Klin. f. Augenh., 1936, v. 97, Oct., p. 523. (See Section 6, Cornea and sclera.)

Orlov, K. X. **The technique of scleral incision in Heine's operation.** Sovietskii Viestnik Opht., 1936, v. 9, pt. 2, p. 115.

Instead of a keratome, the author uses a Graefe knife which has been rounded at the end; he believes that such a knife is less likely to injure the ciliary body than the point of a keratome. (Illustrations.)

Ray K. Daily.

Petrov, M. D. **Cyclodialysis combined with sclerectomy.** Sovietskii Viestnik Opht., 1936, v. 9, pt. 2, p. 119.

Instead of doing a cyclodialysis through a trephine opening, as advocated by Sallman, the author resects a prism of sclera at the scleral incision. The immediate results in sixteen cases were satisfactory. Ray K. Daily.

Wünsch-Heitz, Eva. **The effect of pressure-reducing operations on the unoperated eye.** Zeit. f. Augenh., 1936, v. 90, Nov., p. 259.

The author examined the records of all patients who had been operated on successfully in one eye for primary glaucoma between 1927 and 1934. All cases that might have been secondary to inflammation were excluded. Sixty-nine suitable records were found. There were two classes: in one group, the tension curves of the two eyes were parallel, in the other, apparently unrelated. In 28 of the 69 patients, operations on one eye were followed by a decrease in intraocular tension of the fellow eye, and 21 of these had parallel tonometric curves. Of the 32 with independent tonometric curves, only 7 received benefit in the fellow eye from operation on the other eye. The results indicate that it might be advisable in cases of parallel tonometric curves to operate on a blind glaucomatous eye in the hope of reducing, with much less risk, the tension of a functionally sound glaucomatous fellow eye.

F. Herbert Haessler.

9

CRYSTALLINE LENS

Alves, Odilon. **Dislocation of the lens.** Rev. de Ophth. de São Paulo, 1936, v. 5, Sept., pp. 11-15.

After traumatism, the lens was dislocated into the vitreous, and it could be seen near the iris when the patient looked down. The author made a corneal flap and then an optical iridectomy. He was able to localize the lens by means of the reflected light of the head mirror. It was necessary to incline the patient's head laterally and downward. The lens was withdrawn carefully with the Snellen loupe, but with loss of vitreous. The operative sequels were good and the result was

good, not only as to recovery of vision but as to disappearance of pain.

W. H. Crisp.

Bakker, A. **The significance of vitamin C in the metabolism of the lens.** Graefe's Arch., 1936, v. 136, p. 166.

Experiments with rabbits showed that the lens capsule was easily permeable for vitamin C in both directions. The lens of the rabbit does not possess the ability to form vitamin C. The clearness of the lens is not directly dependent on its content of vitamin C. With failure of vitamin C in the lens, normal metabolism is still possible.

H. D. Lamb.

Bourne, M. C., and Campbell, D. A. **Sulphur metabolism in senile cataract.** Brit. Jour. Ophth., 1936, v. 20, Dec. pp. 684-689.

The authors conducted experiments to estimate the three urinary sulphur fractions in patients with senile cataract and in a control group. The results were similar in all cases and in general followed the findings of Folin in 1905. They lend no support to the hypothesis that a disorder of sulphur metabolism may be the basis of the pathologic changes in the lens in senile cataract. But the experiments were not sufficiently extensive or conclusive to rule out the suggestion completely. (3 tables, references.) D. F. Harbridge.

Calogero, V. N. **Contribution to the study of Marfan's syndrome.** Boll. d'Ocul., 1936, v. 15, Aug., pp. 847-864.

A boy of fourteen years with typical somatic symptomatology of Marfan's disease showed bilateral discoloration and partial atrophy of the iris, iridodonesis, pupils slightly dilatable by atropin, and ectopia lentis. A girl of thirteen years with atypical Marfan syndrome showed defective uncorrectable vision, iridodonesis, and small pupils displaced up and in and slightly dilatable by atropin. (Bibliography, 11 figures.) M. Lombardo.

Csillag, Franz. **Experiments on animal eyes for testing the resistance of the lens capsule. The possibility of removing Morgagnian cataract within the capsule.** Klin. M. f. Augenh., 1936, v. 97, Oct., p. 515.

If a 2-mm. long incision is made in the upper third of the lens capsule of pig's eyes outside of the field of traction, the capsule loses its tension and its lower portion can be grasped with a forceps and the lens removed within the capsule. Forty-two percent of the experiments were successful and the author sees in this an indication for trying the operation in vivo in any case of liquefied lens, especially in Morgagnian cataract. C. Zimmermann.

Disler, H. H. **Secondary cataract.** Sovietskii Viestnik Opht., 1936, v. 9, pt. 2, p. 177.

The author emphasizes the importance of the sawing movement while making a discission. He uses a narrow cataract knife. Ray K. Daily.

Fahmy, A. Y. **Fuchs's heterochromia with cataract.** Bull. Ophth. Soc. Egypt, 1935, v. 28, p. 114.

Two typical cases are outlined and the distinguishing features reviewed. After extraction good vision is obtained but soon begins to deteriorate. The vitreous becomes very fluid and full of filamentous opacities but the fundus is nearly always normal.

Edna M. Reynolds.

Johnson, S. W. **Cataract and ascorbic acid in the guinea-pig eye.** Biochem. Jour., 1936, v. 30, Aug., p. 1430.

The level of concentration of ascorbic acid in the humors of vitamin-C-depleted animals can be raised by injection or oral administration of ascorbic acid. The rates of disappearance of the vitamin from the lens and humors during depletion and of its reappearance in the humors on readministration run parallel therefore with those of the other tissues of the guinea-pig. No cataracts were observed in any of the eyes.

In the apparently normal animals whose humors and lenses were found to be devoid of vitamin C no cataracts were observed. The authors conclude that deprivation of vitamin C in pigs

has no direct bearing on the etiology of cataract in these animals.

Theodore M. Shapira.

Khalil, M. **Cataract extraction by electrodiaphake.** Bull. Ophth. Soc. Egypt, 1935, v. 28, p. 36. (See Amer. Jour. Ophth., 1936, v. 19, June, p. 543.)

McMullen, W. H. **Postoperative distress in cases of senile cataract.** Brit. Jour. Ophth., 1936, v. 20, Dec., pp. 657-666.

The author classifies postoperative distress in cases of senile cataract as being partly physical and partly mental, with each reacting on the other to the disadvantage of the patient. For pain in back and abdomen associated with flatulence a special type of bed is suggested. Postoperative mental distress depends to a considerable degree upon the preoperative handling of the patient. A less severe régime is offered to relieve some of the usual mental distress. (One photograph, references.)

D. F. Harbridge.

Osterberg, G. **A case of ruptured Morgagnian cataract histologically examined.** Acta Ophth., 1936, v. 14, pts. 3-4, p. 471.

In a man aged 25 years injury to the left eye resulted in retinitis proliferans, retinal detachment, and cataract. Nine years later and three weeks after an accident the patient developed rupture of the hypermature cataract with extrusion of the lens masses into the anterior chamber and acute glaucoma. Section of the enucleated eye confirmed the diagnosis. (Illustrations.)

Ray K. Daily.

Russo, A. **Tetany and bilateral cataract after hemithyroidectomy in a young woman affected by Basedow's disease.** Boll. d'Ocul., 1936, v. 15, Aug., p. 890-910.

Twelve days after removal of the right lobe of the thyroid, a woman of eighteen years had severe convulsions which then recurred at varying intervals. Six months later cataract developed in both eyes, rapidly reducing the vision to 1/50. The writer regards tetany and cataract as expressions of the same pathogenetic factor, resulting from disturbance of electrolytic equilibrium, especially of the calcium. The lens opacity is attributed to changes in the capsular permeability arising from chemical disintegration of the intraocular fluid. (Bibliography, one figure.)

M. Lombardo.

Sala, Guido. **Second contribution to pathologic adiposis of the lens.** Boll. d'Ocul., 1936, v. 15, Aug., pp. 811-819.

Four years earlier, a boy of thirteen years had sustained a severe contusion of the right eye. The opaque lens presented the histochemical reactions of adiposis. After removal of the lens the eye had corrected vision of 2/10. The writer assumes that primary infiltrative adiposis in the lens was induced by the fats circulating in the ocular fluids. He calls the clinical entity "xanthomatosis lentis." (Bibliography, 3 figures.)

M. Lombardo.

10

RETINA AND VITREOUS

Bassin, Rajner. **Contribution to the question of detachment of the vitreous.** Klin. M. f. Augenh., 1936, v. 97, Nov., p. 599.

Bassin supplements his report of two cases of posterior detachments of the vitreous by a new case in a man of 38 years with high myopia since childhood. In front of the disc was a horizontal gray opacity, with margins 1 mm. wide, and not closed downward. On ocular movements it swayed like a pendulum, returning at once to its former position. With —12 D. sph. its upper portion could be seen distinctly, but not the lower part, suggesting either that this had remained clear or that it was an incomplete detachment. Temporarily, below the disc, was a diffuse rolled-up gray vitreous mass of the size of three quarters of the disc. The course of the retinal vessels was uninterrupted.

An anterior detachment of the vitreous was observed in a man of seventy years after cataract extraction within the capsule, with total iridectomy. Behind the iris was an oblique oval opening. With the slitlamp a whitish-gray

membrane with thickened margins was seen in the frontal plane, with folds parallel to it, and oscillating on extreme ocular movements. The fundus was normal. C. Zimmermann.

Bistis, J. **General and retinal hypertension.** Rev. Oto-Neuro-Oft., 1936, v. 11, Oct., p. 266.

The normal diastolic retinal pressure is 30-35 mm. Hg and is 45/100 of the general diastolic pressure. While the former and the diastolic pressure in the cerebral circulation are usually parallel to that of the general, and valuable prognostic and diagnostic information is therefore furnished by the latter in cataract extraction, glaucoma, and functional eye disturbances (muscae volitantes), yet retinal and cerebral diastolic pressures are not necessarily parallel, and study of retinal pressure may throw light on the state of cerebral diastolic pressure. M. Davidson.

Braun, Reinhard. **Retinitis diabetica. A critical study of 115 cases of retinal changes from diabetes.** Graefe's Arch., 1936, v. 136, p. 256.

Among 770 diabetics in the metabolism division of the Berlin Westend Hospital, there were found 115 patients with changes in the retina. The frequency of retinal changes from diabetes has not been altered by the introduction of insulin. Now as before insulin, the retinal changes are found most frequently in cases of long duration and not so much in acute cases. Usually it occurs in older patients. Characteristic is absence of edema, prevailing lack of involvement of the papilla, and usual lack of findings in the vessels by ophthalmoscopy. Still entirely unexplained but certainly of great significance is the association of nervous factors (vegetative nervous system). There exists as yet no satisfactory explanation for the mode of origin of diabetic retinitis. Intermediate metabolism with special reference to components leading to elimination of ketone bodies on the one hand and capacity for elimination by the kidneys on the other hand, are factors meriting particular attention.

H. D. Lamb.

Ehlers, Holger. **Further results derived from diathermy treatment of detachment of the retina.** Acta Ophth., 1936, v. 14, pts. 3-4, p. 493.

In 37 cases treated by the technique described by the author in 1935, the percentage of cures was 47 percent.

Ray K. Daily.

Kamogawa, A. **Variations of blood pressure in the central retinal artery in changed positions of the body, in healthy subjects.** Klin. M. f. Augenh., 1936, v. 97, Nov., p. 611.

Measurements, with the new ophthalmodynamometer of Uyemura and Suganuma, of the blood pressure in the central retinal arteries of thirty persons with healthy circulatory systems, immediately after change from the sitting to the horizontal recumbent position, showed an increase of pressure by 11.3 mm. Hg diastolic, and 13.4 mm. Hg systolic. The weight of the blood, its altered distribution in the body, and the changed tonus of the muscles and vessels due to changes of body position are considered as causes, but the author does not doubt that there may be various other complicated, although comparatively minor, etiologic factors.

C. Zimmermann.

Lindberg, J. A. **A new ophthalmodynamometer.** Acta Ophth., 1936, v. 14, pts. 3-4, p. 311.

A description of a cup-shaped ophthalmodynamometer which is connected to a mercury manometer for registering the pressure exerted on the eyeball. This instrument permits measuring pressure in the retinal vessels while the fundus is observed with the Gullstrand ophthalmoscope. (Illustration.) Ray K. Daily.

Löwenstein, Arnold. **A so-far undescribed phenomenon in the vitreous—congenital pit formation in the optic disc.** Klin. M. f. Augenh., 1936, v. 97, Nov., p. 607.

In a typical case of congenital pit formation in the optic disc, in the amblyopic left eye of a woman of 35 years, a pulsatory regular propulsion of nebulae of the vitreous was observed. The pit seemed to communicate openly with

the vitreous chamber. The pulsatory phenomenon supports Szily's explanation that the congenital pit is a remnant of the cavity of the stalk of the optic cup. Interpretation of the phenomenon as an intermittent flow of cerebrospinal fluid into the vitreous would imply that the eyeball and its tissues might without disturbance take in an excess of fluid. (Illustrated.)

C. Zimmermann.

Osterberg, G. **Three cases of acute traumatic chorioretinitis (Siegrist) with histologic examination of one eye.** Acta Ophth., 1936, v. 14, pts. 3-4, p. 460.

The clinical histories and the detailed histologic report support Siegrist in his contention that the etiologic factor is injury to a short ciliary artery. (Illustrations.) Ray K. Daily.

Rieger, Herwigh. **The significance of changes in the choroid for the genesis of vitreous detachment.** Graefe's Arch., 1936, v. 136, p. 119.

In both eyes of all cases, with the pupil dilated ad maximum, the vitreous was searched with the ophthalmoscope from the papilla to the lens for opacities of any kind. With the slitlamp and corneal microscope, the anterior part of the vitreous was examined in the customary way. Finally the posterior part of the vitreous was studied after application of a contact glass with a flat surface of 10 mm. (after Koeppe) or of 15 mm. (after Lindner).

Among 182 persons varying in age between 10 and 80 years, 321 eyes with simple myopia of all amounts were investigated. Detachment of the vitreous was considered positive when the posterior limiting layer of the vitreous appeared thickened against an optically usually empty-looking medium external to it. Increasing with age and with the amount of myopia, vitreous detachment was found positive in 188, and doubtful in 24 eyes. In 35 eyes with simple myopia belonging to individuals with retinal detachment in the fellow eye, vitreous detachment was positive in 28 and doubtful in 4 eyes. Changes in the choroid were differentiated as between those in the periphery and those around the posterior pole of the eye. In the 321 eyes with simple myopia, peripheral changes were commoner with increasing age, and changes around the posterior pole were commoner with greater amounts of myopia.

Sixty-eight eyes with senile detachment of the vitreous are reported. In emmetropes and hypermetropes between 40 and 60 years old, detachment of the vitreous was rare.

Among fourteen individuals with retinitis pigmentosa, seven were myopic and showed detachment of the vitreous in both eyes, while in only one of the seven nonmyopic persons with retinitis pigmentosa was vitreous detachment absent. The author thinks the extensive involvement of the choroid always existing in retinitis pigmentosa is the basic factor.

Of 46 eyes with uveitis of various forms, 29 presented detachment of the vitreous and 3 were doubtful. In more advanced ages and with higher degrees of myopia, detachment of the vitreous was commoner also in this series.

H. D. Lamb.

Scheerer, Richard, **Constitution and ocular fundus.** Klin. M. f. Augenh., 1936, v. 97, Nov., p. 602.

By examinations of the fundus continued for years, Scheerer has become convinced that the blood vessels of the retina indicate constitutional differences which forthwith are the bases for certain diseases. At about the fiftieth year such differences are encountered very frequently. C. Zimmermann.

Shein, I. S. **Berlin's retinal opacity.** Sovietskii Viestnik Opht., 1936, v. 9, pt. 3, p. 356.

A bilateral case of Berlin's retinal opacity, caused by a blow on the eyes with a lump of clay. Complete recovery.

Ray K. Daily.

Stock, W. **A so-far undescribed rapid form of pigment degeneration of the retina with complete dementia.** Klin. M. f. Augenh., 1936, v. 97, Nov., p. 577.

In 1908 Stock (Klin. M. f. Augenh., v. 46, p. 225) reported in three children of the same family a special form of

pigment degeneration of the retina which led after a few years to blindness and dementia. He has now observed another case in a man of 25 years. The ocular affection commenced in September, 1935, with rapid failure of vision. March 5, 1936, the patient had an epileptic seizure, followed by others with dementia, and he died on May 28. The autopsy revealed progressive neurodegeneration of brain and spinal cord, and complete destruction of the nervous elements of both retinae. The occurrence of caverns in the optic nerve without excavation supports the author's opinion that they cannot be the cause of excavation but develop from rapid disintegration of the optic-nerve fibers. In distinction from the usual forms of pigment degeneration this type commences later in life in healthy persons and is diffuse. (Illustrated.)

C. Zimmermann.

Suganuma, Sadaaki. **Studies on blood pressure in the central retinal artery.** 2nd communication: **On blood pressure in the retinal artery in different kinds of general hypertony, and on so called isolated cephalic hypertension.** Klin. M. f. Augenh., 1936, v. 97, Oct., p. 498.

The author found the average proportion of the systolic pressure in the retinal artery to general blood pressure to be 56:100 in essential hypertony, and 51:100 in chronic nephritis and secondary shrinking of the kidney, fluctuating in different cases. The relation of pulse pressure to maximal pressure (that is, the blood pressure coefficient) of the retina averages 0.28 in essential hypertony and 0.24 in nephritis. The capillary blood pressure in the macular region shows an irregular increase in general hypertension. As cases of isolated cephalic hypertension were included those in which the general blood pressure was normal and only the pressure in the central retinal artery was increased. The author found this hypertension not only in various specific diseases, as increase of cerebral pressure, pregnancy kidney, epilepsy, retrobulbar neuritis, but also during certain stages of essential hypertony or chronic nephritis. He is convinced that it is not rare although easily overlooked. Arteriovenous compression at the crossings of the retinal vessels (Gunn-Salus phenomenon) is generally produced by augmented tonus of the arterial wall, that is, by increased retinal blood pressure. It is especially intense in simultaneous organic alterations of the vascular walls. The degree of the phenomenon does not run parallel with the height of the local retinal blood pressure. C. Zimmermann.

Terry, T. L. **Diathermy in cataract extraction.** Amer. Jour. Ophth., 1936, v. 19, Dec., p. 1105.

Tertsch, Rudolf. **Can a law be formulated of connection of hereditary pigment degeneration of the retina with a blood group?** Klin. M. f. Augenh., 1936, v. 97, Nov., p. 585.

The investigations suggest that among children of the same family a connection exists between hereditary pigment degeneration of the retina and blood grouping. The genealogic trees described do not prove dependence of the disease on a certain blood grouping, as it occurred in all blood groups. But the affected children belonged to the same blood group, the homozygotic healthy children to another one. The practical import of these researches is that a way may be found to separate hereditary healthy from hereditary suspect individuals, thus leading to prevention of diseased progeny.

C. Zimmermann.

Victoria, M., and Lijo Pavia. J. **The adiposogenital syndrome and retinal changes.** Rev. Oto-Neuro-Oft., 1936, v. 11, Oct., p. 269.

The literature is reviewed and the conclusions are arrived at that the term "Lawrence-Moon-Biedl syndrome" (Bardet however having preceded Biedl by two years in describing it) should be applied only to those cases which present the complete picture: obesity, infantilism, retinitis pigmentosa, and polydactylism; that a hereditary factor is probably essential; and that pressure on the tuberohypophyseal system by the deformed dorsum sellae is the likely mechanism. M. Davidson.

11

OPTIC NERVE AND TOXIC AMBLYOPIAS

Arruga, H. **New pathologic and therapeutic orientations in tabetic atrophy of the optic nerve.** Arch. de Oft. Hisp.-Amer., 1936, v. 36, July, pp. 365-373. (See Amer. Jour. Ophth., 1937, v. 20, Jan., p. 100.)

Carroll, F. D., and Franklin, C. R. **Tobacco amblyopia; alcohol amblyopia.** Amer. Jour. Ophth., 1936, v. 19, Dec., pp. 1070-1072.

Clegg, J. G. **The optic foramen.** Brit. Jour. Ophth., 1936, v. 20, Dec., pp. 667-673.

It is the author's opinion that careful and accurate radiography should be carried out in all cases of affection of the optic nerve. By detail which does not lend itself to abstract, he discusses these radiographic processes. Definite proof of variation in the lumen and in the state of the walls of the optic foramen, as well as negative findings, are regarded by the author as useful guides in these cases. (One diagram, bibliography.) D. F. Harbridge.

Löwenstein, Arnold. **A so-far undescribed phenomenon in the vitreous—congenital pit formation in the optic disc.** Klin. M. f. Augenh., 1936, v. 97, Nov., p. 607. (See Section 10, Retina and vitreous.)

Marshall, D., and Laird, R. G. **Ocular changes in multiple sclerosis.** Amer. Jour. Ophth., 1936, v. 19, Dec., pp. 1085-1093.

Plitas, P. S. **Severe ocular complications in malaria.** Sovietskii Viestnik Opht., 1936, v. 9, pt. 3, p. 316.

Acute optic neuromyelitis following malaria set in with acute interstitial optic neuritis and complete amaurosis. Two weeks later the patient developed paralysis of the lower extremities and of the sphincters. Ray K. Daily.

Rifat, A. **Contribution to the etiology of familial diseases of the optic nerve.** Ann. d'Ocul., 1936, v. 173, Sept., pp. 702-715.

Familial diseases of the optic nerve may be divided into three groups. The first is the subacute retrobulbar neuritis of Leber. This usually begins between the ages of twenty and thirty years and affects principally the macular bundle of fibers. Another type, familial total atrophy of the optic nerve, involves all of the fibers. The third type of disease is congenital atrophy of the nerve, in which the individual is blind from birth. Seven cases are reported with family trees illustrating these three types.

Rifat considers that all of these diseases are manifestations of hereditary syphilis. To support this he points out numerous stigmata of hereditary syphilis in the cases observed and histories very suggestive of syphilis in their ancestors. He also cites from the literature other cases that were probably syphilitic. John C. Long.

Sudakevich, D. I. **Retrobulbar neuritis as the initial stage of Leber's optic atrophy.** Sovietskii Viestnik Opht., 1936, v. 9, pt. 2, p. 165.

This is a review of the literature and a report of a family of three sons and six daughters, of which one son had the disease and three daughters transmitted the disease to their sons. Because of the age at which the disease sets in and its mode of onset, the author believes that the hereditary factor is an instability in the coördinating function of the anterior portion of the pituitary, leading to loss of function of the sensitive papillomacular bundle. Ray K. Daily.

Tartakoff, S., and Dalton, S. J. **Leber's disease (hereditary optic atrophy).** Med. Bull. Veterans' Administration, 1936, v. 13, Oct., p. 167.

The authors report three cases, all three in males, in a family of six. Psychic instability was also present. No hereditary basis was found for development of the disease in this group.
Theodore M. Shapira.

Vladichenskii, A. P. **Involvement of the optic nerve in intoxication with plasmocide.** Sovietskii Viestnik Opht., 1936, v. 9, pt. 3, p. 313.

Two cases of optic neuritis followed

by optic atrophy, complicating plasmocide poisoning. Ray K. Daily.

Wetzel, J. O. **Aneurism of the internal carotid artery with atrophy and compression of the optic nerve.** Amer. Jour. Ophth., 1936, v. 19, Dec., pp. 1053-1059.

12

VISUAL TRACTS AND CENTERS

Horanszky, N. **Geniculate bodies and visual cortex in unilateral atrophy of the optic nerve (monophthalmos).** Klin. M. f. Augenh., 1936, v. 97, Oct., p. 438.

A man aged 61 years, who died after an operation for rectal carcinoma, had lost his left eye from an injury during the World War. Autopsy showed the stump of the left optic nerve atrophic and gray, the cross section of the right optic tract two-thirds the size of the left normal tract. The geniculate bodies were examined in Nissl series. The left showed atrophy of the central large and intermediate cell strata, the right showed changes in all peripheral lamellae, and the ganglion cells showed a 31-percent deficiency of the central strata of the left external geniculate body and a 23-percent deficiency of the peripheral lamellae of the right side. The substantia grisea pregeniculata of each side, the optic nerve nuclei, and the optic radiation presented no pathological changes, and the calcarine cortex was intact. Thus the anatomical findings fully confirmed the statements of Minkovski, according to whom the question of the terminations of the crossed and uncrossed optic fibers in the external geniculate bodies can be considered as definitely settled.

C. Zimmermann.

Malbran, J., and Riega, E. de la. **A case of double hemianopsia.** Arch. de Oft. de Buenos Aires, 1936, v. 11, Sept., p. 538.

Aside from the rare cases of double hemianopsia from bilateral tract involvement in basal processes, or from involvement of a tract on one side and of an intracerebral optic pathway on the other side, most frequently a double homonymous hemianopsia is the result of bilateral involvement of the retrogenicular pathways or of the occipital cortex. The involvement is generally successive to vascular lesions or simultaneous with injury: gunshot wounds, missiles, or falls. Among the 174 cases which the author has found recorded in the literature, many of traumatic origin, 67 were reduced to tubular vision, the rest presenting bilateral symmetric or asymmetric field defects or occasionally "cortical" blindness without sparing of the maculae. As in any right-sided homonymous hemianopsia, the optic agnosias and apraxias are encountered in the bilateral hemianopsias, as well as achromatopsias. The case reported occurred in a man of seventy years, following loss of consciousness while straining at stool, with blindness of 4 or 5 days duration and recovery of a remarkably symmetric lower quadrant of his fields including the maculae. The final vision was 9/10, but the patient had to walk with his head raised. Bilateral softening in the area of distribution of branches of the posterior cerebral arteries is the explanation suggested. There were no agnosias.

M. Davidson.

Mayendorf, Niessl. **The existence of areas of softening in the optic nerve, chiasm, and tract.** Zeit. f. Augenh., 1936, v. 90, Nov., p. 241.

When at a meeting in Paris the author demonstrated areas of softening in preparations from the corpora quadrigemina with consecutive secondary degeneration in the cells and fibers of the optic tract, one of the discussers suggested that the pale areas in the Weigert preparations were probably arteriosclerotic foci in the optic tract, chiasm, and nerve.

In the present essay the author seeks to show that high-grade sclerosis of the basal arteries of the brain is not associated with small areas of softening in the optic tract. To prove his contention he presents photographs of the base of the brain and of stained sections of the entire chiasma as well as a description

of the autopsy findings in three patients with severe cerebral arteriosclerosis.

F. Herbert Haessler.

Merkulov, I. I. **X-ray therapy of tumors in the pituitary fossa.** Sovietskii Viestnik Opht., 1936, v. 9, pt. 2, p. 134.

In tumors of the sella turcica early visual-field studies are of great diagnostic value. Bitemporal hemianopsia as well as fundus changes are signs of an advanced stage. The author urges X-ray therapy as the first therapeutic procedure in all cases, reserving surgery for the cases in which X rays fail.

Ray K. Daily.

Rönne, Henning. **The structure of the cortical visual centers correlated to the author's scintillating scotoma.** Acta Ophth., 1936, v. 14, pts. 3-4, p. 341.

The author projects his scintillating scotoma and correlates its form to the position of the fibers in the visual cortex. The occipital cortex representing the temporal portion of the retina is supplied by the calcarine artery, while the areas representing the maculae are supplied by arteries from the convexity of the brain. The form of the author's scotoma indicates that the disturbance originates between these two areas and extends into the area supplied by the calcarine artery. Ray K. Daily.

13

EYEBALL AND ORBIT

Bulach, X. **Transplantation of hyalin cartilage.** Sovietskii Viestnik Opht., 1936, v. 9, pt. 3, p. 329.

Review of the literature and the author's own experience lead him to conclude that costal cartilage is the best material for repair of orbital defects. The cartilage with the periosteum retains its vitality for a long time, although it shrinks in size. Best results are obtained by making the incision away from the position of the transplant and undermining to the desired area, or covering the transplant with cutaneous flaps on broad bases. Avoidance of sutures over the transplant is essential to successful grafting.

Ray K. Daily.

Csillag, Franz. **An especially interesting cured case of unusually large mucocele of the frontal sinus with grave visual disturbances.** Klin. M. f. Augenh., 1936, v. 97, Nov., p. 663.

In a woman aged 52 years, a very large mucocele of the right frontal sinus produced exophthalmos, with displacement of the right eyeball downward and temporally and vision reduced to counting fingers at one meter. The ocular changes were protrusion and edema of the optic disc and edema of the adjacent retina with enlarged and moderately tortuous veins. Through an incision along the eyebrow the mucocele was removed. The bony walls of the frontal sinus were found destroyed, with erosion of parts of the dura mater. Complete recovery occurred and vision improved rapidly. Skiascopy showed astigmation of 2.50 D., apparently due to compression of the globe by the tumor. (Illustrated.)

C. Zimmermann.

Dauksys, Joseph. **Xanthomatosis (Schüller-Christian's disease.)** Med. Bull. Veterans' Administration, 1936, v. 13, July, p. 40.

A white male of 37 years showed bony defects in the skull, diabetes insipidus, and exophthalmos. This is the 124th case reported in the literature.

Theodore M. Shapira.

Rosenbaum, Morris. **Unilateral congenital anophthalmos with orbitopalpebral cyst.** Amer. Jour. Ophth., 1936, v. 19, Dec., pp. 1101-1104.

Soria, M. **Orbital pseudotumor.** Arch. de Oft. Hisp.-Amer., 1936, v. 36, June, pp. 310-317.

In a man of 34 years, right ptosis and exophthalmos had existed for four months. A colleague had removed a small piece of tissue examination of which suggested sarcoma. Further tissue removed by Soria showed the abnormal growth to consist of ordinary granulomatous tissue. X-ray of the lungs pointed to tuberculosis, and the ocular symptoms subsided in the course of several months under treatment with tuberculin. W. H. Crisp.

14

EYELIDS AND LACRIMAL APPARATUS

Argañaraz, R. A. **A critical study of the medico-surgical treatment of dacryocystitis.** Arch. de Oft. de Buenos Aires, 1936, v. 11, Oct., p. 567.

The author believes that the lacrimal gland is simply an emergency organ, acting only when reflexly irritated; that normal permeability of the lacrimal passages alone is not sufficient to prevent epiphora; that dacryocystitis is the result of sealing of the sac at both ends (and not only of the nasal canal), converting it into a closed septic cavity; and that drainage of the lacrimal sac is the fundamental condition for cure of a dacryocystitis. For a large number of cases an ample opening into the occluded sac from the conjunctiva is advocated, as a more rational treatment than either sounding or extirpation of the sac. For this purpose the upper canaliculus is used, after dilatation, to permit a no. 3 and a no. 5 sound to pass into the nase. A Weber knife is then used to open the sac from above down and to break up adhesions in the nasal canal. A glass catheter is then introduced for a few days to maintain patency. Argañaraz believes that endonasal dacryocystorhinostomy is superior to the Toti or the Dupuy-Dutemps operation, but it is essentially a rhinologist's operation. External dacryocystorhinostomy is moreover a difficult operation, hence its unpopularity among ophthalmologists.

M. Davidson.

Charamis, Jean. **Contribution to surgical treatment of congenital colobomas of the lids.** Ann. d'Ocul., 1936, v. 173, Oct., pp. 810-819.

A congenital coloboma of the left upper lid is reported in a girl of ten years. The parents were syphilitic. The coloboma was extensive and had the shape of an inverted "W." The eye was poorly protected and the cornea was scarred from exposure keratitis. Under local anesthesia both lids were split into two layers, one containing conjunctiva and tarsus and the other skin and muscle. The tarsal layers of the two lids were sutured together and a pedicle graft of skin from the region of the nose was brought down to cover the exposed area of tarsus in the upper lid. After a month the lids were separated by a horizontal incision. This operation brought about complete closure of the lid defect and produced an upper lid that functioned well.

John C. Long.

Ducuing, Couadau, and Lu-Van-Xuong. **The treatment of epithelioma of the lids.** Arch. d'Opht., 1936, v. 53, Nov., p. 800.

At the anti-cancer center of Toulouse 55 cases of epithelioma of the lids were observed and treated. From this experience and analysis of the literature the authors have written a comprehensive review of the subject. They conclude that the therapeusis of epithelioma is still in evolution. Radium, surgery (alone or associated with radiation), and electrosurgery are the methods of choice. Surgery, to be efficacious, should be generous. Radiotherapy should aim at sterilization of the cancer at one dose, the sensitivity of the lesion diminishing greatly with repetition of treatment. Electrosurgery gives the best results in bad cases. (Illustrations, references.) Derrick Vail.

Fahmy, A. Y. **Three operations improved with success (advancement, cyclodialysis, entropion).** Bull. Ophth. Soc. Egypt, 1935, v. 28, p. 29. (See Section 8, Glaucoma and ocular tension.)

Gaevich, E. P. **Mikulicz disease and tuberculosis.** Sovietskii Viestnik Opht., 1936, v. 9, pt. 3, p. 337.

A report of a clinical case of Mikulicz disease, in which inoculation into a guinea-pig established the tuberculous etiology of the affection.

Ray K. Daily.

Holth, S. **Mimetic ectropion of the lids.** Acta Ophth., 1936, v. 14, pts. 3-4, p. 340.

A fourteen-year-old boy could evert the lids voluntarily. Ray K. Daily.

Klivanskaja, A. A. **Treatment of blepharitis with silver water.** Sovietskii Viestnik Opht., 1936, v. 9, pt. 2, p. 209.

This preparation contains a weak solution of silver ions. The author used it on twenty cases of chronic blepharitis with very satisfactory results.

Ray K. Daily.

Krachmalnikov, L. L., and Kuprianova, H. A. **Rhinogenic etiology of epiphora.** Sovietskii Viestnik Opht., 1936, v. 9, pt. 2, p. 225.

The author argues that persistent epiphora may frequently be caused by apparently insignificant nasal lesions, and that the essential therapy of epiphora is treatment of the nasal pathology.

Ray K. Daily.

Lazarescu, D., and Damian, E. **Calcemia and calcium therapy of so-called eczematous blepharokeratoconjunctivitis.** Klin. M. f. Augenh., 1936, v. 97, Nov., p. 626. (See Section 5, Conjunctiva.)

Michaïl, D. **Research on lacrimal elimination of sodium chloride.** Ann. d'Ocul., 1936, v. 173, Sept., pp. 715-734.

Tears were collected under a number of conditions by means of a capillary pipette and the sodium chloride content was determined. The normal sodium-chloride concentration was found to be 8.23 parts per thousand. The content was lowered in acute inflammatory conditions and raised in chronic disease. The sodium-chloride excretion under the influence of pilocarpin, atropin, lacrimal-gland extract and the oculocardiac reflex indicated that the elimination varied with the tonus of the lacrimal neurovegetative apparatus. Ovarian hormone increased the concentration in both sexes. Injection of salt solutions affected the sodium-chloride output only when injections were made in the ocular region. The effect of pericarotid sympathectomy apparently demonstrated that there are anastomotic lacrimal secretory fibers between the pericarotid plexuses of the two sides.

John C. Long.

Nazarov, I. I. **Paralytic lagophthalmos in tuberculoid leprosy.** Sovietskii Viestnik Opht., 1936, v. 9, pt. 3, p. 306.

A report of a case of the tuberculoid type of leprosy, with marked infiltration, sharp demarcation, diminished sensitivity of the diseased skin, unilateral paralysis of the lids, and lagophthalmos. There was no atrophy, contracture, trophic disturbance, or inflammatory involvement of the eyeball, in spite of the length of the process. The diagnosis was made histologically.

Ray K. Daily.

Pascheff, C. **Trichosis tarsi.** Klin. M. f. Augenh., 1936, v. 97, Oct., p. 517.

The left eye of a child of one year showed redness and epiphoras. The mother stated that immediately after birth of the child she had seen an elevation on the left upper lid. Once while bathing the child and pressing on the lid, the elevation had ruptured, evacuating a whitish fluid and numerous white and black hairs. Ever since, the eye had easily become red and teared. The conjunctiva presented intensely developed follicles and in the center of the everted lid was a group of black hairs, which irritated the eye. After epilation the irritation subsided. Most likely the original lump had been a dermoid cyst. (Illustrated.)

C. Zimmermann.

Pochisow, N. **The operative treatment of spastic entropion.** Ann. d'Ocul., 1936, v. 173, Sept., pp. 737-741.

Pochisow describes an operation for spastic entropion which he states is very similar to that recently proposed by Poulard (see Amer. Jour. Ophth., 1935, v. 18, p. 601). An external canthotomy is done and the external ligament is cut. Sutures are placed in such a manner that a temporary ectropion results. (Illustrated.)

John C. Long.

Ribnikova, O. I. **Additional data on the future of the implant in Schneller's operation.** Sovietskii Viestnik Opht., 1936, v. 9, pt. 3, p. 324.

A cyst developed in a buried cutaneous implant containing desquamated epithelium, hair, and secretion of sebaceous glands. This condition, verified microscopically, existed for ten years following an operation for entropion. The case is reported to support Towbin's criticism of Schneller's oper-

ation (see Amer. Jour. Ophth., 1935, v. 18, p. 491). Ray K. Daily.

Sergeev, I. V. **Rational therapy of catarrhal dacryocystitis and strictures of the lacrimal puncta.** Sovietskii Viestnik Opht., 1936, v. 9, pt. 2, p. 222.

The author considers narrowing of the lacrimal canaliculus the important factor in the etiology of dacryocystitis. He dilates the punctum, incises the canaliculus at its origin with a narrow discission knife, and excises a triangular piece of the posterior wall of the canaliculus at the punctum.

Ray K. Daily.

Strebel, J. **Allergic edemas of the lids and their causes. Trophallergic conjunctivitis with lid edema, unilateral edema of the upper lid in taridiosyncrasy, edema of the lower lid in acute pollen allergy.** Klin. M. f. Augenh., 1936, v. 97, Nov., p. 644.

Cases of the above-mentioned types are reported to prove that if in edema of the lids no bacterial, toxic, or mechanical causes, such as disturbances of heart, kidneys, or blood exist, one must think of an allergic etiology. Artificial allergy with subsequent shock may also be caused by therapeutic milk injections, as Strebel once observed in a small child with gonorrheal conjunctivitis after a third injection. (Illustrated.) C. Zimmermann.

Strebel, J. **Failures in healing of epiphora by electrocoagulation of the lacrimal gland, their cause and remedy.** Klin. M. f. Augenh., 1936, v. 97, Oct., p. 518.

After four unsuccessful electrocoagulations of the lacrimal gland an incision was made over the lower lacrimal gland, which was found obliterated with the exception of a lobe behind and below the fronto-zygomatic suture. This was enucleated and the epiphora subsided. To avoid relapses the openings of the ductules of the lacrimal gland, which after eversion of the upper lid can be recognized as a row of fine dots in the lateral part of the upper fornix, ought to be occluded by diathermy.

C. Zimmermann.

Wokurek, W., and Kraupa, E. **Congenital atresia of the lacrimonasal duct.** Zeit. f. Angenh., 1936, v. 90, Nov., p. 273.

In the last four years the authors have observed congenital atresia of the lacrimonasal duct in ten infants, or more frequently than the books lead one to believe. They recommend immediate probing with a no. 1 Bowman sound, and have never noted any harm from this method. The procedure can be easily carried out without anesthesia if the infant is thoroughly wrapped in a blanket. The condition has frequently been described as familial.

F. Herbert Haessler.

Zbarskii, A. I., and Franzusov, B. L. **Epiphora and nasal pathology.** Sovietskii Viestnik Opht., 1936, v. 9, pt. 2, p. 214.

Coöperative investigation of the rhinologic and ophthalmologic service of a military hospital, to determine the etiology of epiphora, showed the close relation of epiphora to nasal pathology. Of 100 patients operated upon for pathologic conditions in the nose, 59 percent had disturbances of permeability of the lacrimal passages as shown by West's test; and 62 percent of patients seeking relief for epiphora had pathologic conditions in the nose. The author stresses the importance of rhinologic examination and treatment in the management of epiphora.

Ray K. Daily.

15

TUMORS

Bietti, Giambattista. **Hemangioendothelioma of unusual aspect, with intravascular growth, developed on the anterior wall of the lacrimal sac.** Boll. d'Ocul., 1936, v. 15, Sept., pp. 1003-1013.

A woman of 31 years had a vascular neoformation which appeared histologically to be of endothelial nature. It originated from the inner coat of a prelacrimal blood vessel and followed the original vessel in its ramifications. The neoformation is unique in ophthalmic literature, and is rare even in general pathology. (Bibliography, 11 figures.)

M. Lombardo.

Ennema, M. C. **Lymphoma of the conjunctiva.** Acta Ophth., 1935, v. 13, pts. 3-4, pp. 225-239.

With a review of the rather scanty literature of the subject, the author reports four cases from the Amsterdam eye clinic. The tumors were reddish in color and had smooth surface. Histologically the tumor cells had the appearance of lymphocytes. The best treatment is excision. (Illustrations, references.) W. H. Crisp.

Papolczy, Franz. **Metastases of a mammary carcinoma in both eyes.** Klin. M. f. Augenh., 1936, v. 97, Oct., p. 486.

Four months after operation of a mammary carcinoma in a woman of 46 years metastasis developed in the left eye with detachment of the retina and secondary glaucoma. Within ten weeks complete blindness was produced in a similar manner in the right eye. The author explains the great rarity of ocular metastasis by the very small volume of the choroid. (Illustrated.)

C. Zimmermann.

Teräskeli, Hilja. **Radiotherapy of intraocular glioma.** Acta Ophth., 1936, v. 14, pts. 3-4, p. 380.

Of seven cases, only one can be reported as cured. The dosage in this case was far below that used in some of the unsuccessful cases. The author concludes that at present radiotherapy is still in the experimental stage and is justified solely for treatment of an only eye. Ray K. Daily.

16

INJURIES

Denecke, Hans. **Contribution to the prognosis of uveal sarcoma.** Klin. M. f. Augenh., 1936, v. 97, Nov., p. 594.

The 36 cases of uveal sarcoma observed at the eye clinic of the University of Greifswald within the last twenty years include 26 of the choroid, 2 of the iris, and 4 of the ciliary body, the last most frequently followed by metastasis. Most of the cases occurred in the sixth decade of life; fourteen died from metastasis; and the critical period is the first five years after the operation. After this the probability of metastasis is much less, and after ten years it is so slight that it has no practical significance. The nineteen pigmented sarcomas did not show a greater tendency to metastasis than the seventeen unpigmented. A local relapse never occurred. The prognosis of tumors which have broken through into the orbit does not seem absolutely bad, as the patient still lives twelve years after exenteration. In the third case the perforation was histologically found after enucleation. Without subsequent exenteration the patient is still living thirteen years after enucleation.

C. Zimmermann.

Fiore, Tito. **A rare case of total traumatic aniridia.** Boll. d'Ocul., 1936, v. 15, Aug., pp. 865-870.

As the result of injury by a broken piece of porcelain plate, a man of 22 years showed complete splitting of the left upper lid above and parallel to the convex tarsal border, and rupture of the eyeball along a line starting at the nasal extremity of the horizontal meridian and terminating in the vertical meridian of the sclera 4 mm. below the limbus. After disappearance of blood from the anterior chamber the iris was found to be entirely absent and the lens in normal position. The eye had vision of 8/10 with a stenopeic hole. (Bibliography, 3 figures.) M. Lombardo.

Grósz, Emil. **The technique of extracting magnetic foreign bodies from the anterior chamber.** Klin. M. f. Augenh., 1936, v. 97, Oct., p. 517.

The following method is recommended: After the foreign body has been drawn into the anterior chamber through an incision over the dilated pupil (not at the limbus, but 2 or 3 mm. within the cornea), the flat tip of the hand magnet is inserted and approached to the foreign body.

C. Zimmermann.

Heinsius, Ernst. **Severe corneal injury from concentrated tear gas (Bromaceton).** Zeit. f. Augenh., 1936, v. 90, Nov., p. 266.

Bromaceton splashed into the face of a chemist, and despite his goggles his

eyes were exposed to the vapor. The skin became red and swollen and in large areas the epithelium was destroyed. The conjunctiva was chemotic and the cornea so opaque that the deeper structures were invisible. Two months later, the right cornea was still completely opaque and deeply vascularized. The left cornea was less vascularized and more transparent, and this eye had visual acuity of 2/25 with some hope of further clearing.

F. Herbert Haessler.

Klauber, E. **X-ray cataract.** Klin. M. f. Augenh., 1936, v. 97, Oct., p. 522.

The anterior margin of the left orbit of a woman aged 61 years presented a firm tumor which caused enophthalmos and impeded ocular motility. An exploratory excision showed the tumor to contain lipoid of the kind found in inflammatory tumors. This should only be treated with X rays. After two and a half years growth was found arrested, but a posterior cortical cataract had developed and it progressed. The patient had been forewarned of this eventuality.

As to another patient of forty years with subcapsular opacity of the right lens and opacities at the posterior pole of the left lens it was found that ten years earlier she had been treated nine times with X rays for acne of the face.

C. Zimmermann.

Minton, Joseph. **Industrial eye injuries and their prevention.** Brit. Jour. Ophth., 1936, v. 20, Dec., pp. 673-682.

Of 10,786 cases in the casualty department of the Royal Eye Hospital, London, 6,500 were industrial. Hammering and chipping caused the highest number of intraocular foreign bodies. Corneal lodgment of foreign bodies formed the bulk of such injuries, with corneal abrasions coming second. Subtarsal foreign bodies are reported as rare. It is shown by insurance statistics that eye hazards are more serious than any other group of accident hazards not resulting in death. Goggles, masks, veils, and screens are described as protective measures for the various industrial occupations. If insurance companies will join with employers in requiring the use of these protective devices, there will be a considerable reduction of partial and total blindness from this class of injury. (References.)

D. F. Harbridge.

Müller, S. B. **Protection of the eye in electric welding.** Sovietskii Viestnik Opht., 1936, v. 9, pt. 3, p. 298.

The author believes that electric-welding shops should be highly illuminated, and that the best type of protective guard is that on a headband.

Ray K. Daily.

Natanson, D. M., Peisachovich, I. M., Vinogorov, D. P., and Kostenko, P. G. **The effect of arc light on the eye.** Sovietskii Viestnik Opht., 1936, v. 9, pt. 3, p. 289.

An experimental study on rabbits to determine the effect of isolated infrared rays on the deep structures of the eye, under conditions simulating exposure of the eye in electric welding. The infrared rays from the electric-welding arc, concentrated on the eye, produce permanent damage in all the tissues of the eye. The retinal changes caused by the infrared rays are greater than those caused by the complete arc light. In contradistinction to the effect of the complete arc light the infrared rays do not affect the conjunctiva, and cause only insignificant changes in the cornea. They produce opacities in the capsule and cortex of the lens. Ray K. Daily.

Sharp, C. G. K. **A new eye shield for use in industry.** Brit. Jour. Ophth., 1936, v. 20, Dec., p. 683.

A miner's eye shield must provide these qualities: no reduction of illumination; free ventilation in front of face; in use or out of use without removal; strong enough for use of pick-and-shovel men yet light in weight; ease in adjusting for wear. The author describes a shield which he feels fits the situation in all respects.

D. F. Harbridge.

17

SYSTEMIC DISEASES AND PARASITES

Makarov, H. H. **Ocular disease in malaria.** Sovietskii Viestnik Opht., 1936, v. 9, pt. 3, p. 319.

Four cases of ocular disease of malarial etiology are reported—two of keratitis, one of glaucoma, and one of muscular asthenopia. Ray K. Daily

Rameev, P. S. **Ocular complications in Pappatasi fever.** Sovietskii Viestnik Opht., 1936, v. 9, pt. 3, p. 347.

In 1934 there was in Central Asia an epidemic of this acute infection, which is probably caused by a filtrable virus. Ocular complications are rare. For this reason the author reports his observations of two cases of keratitis, similar to the type seen in grippe and malaria; two cases of cataract; and one of dilatation of the retinal blood vessels, with hyperemia and blurring of the disc.
Ray K. Daily.

Solotnitzky, I. N. **The nasal-nerve syndrome.** Acta Ophth., 1936, v. 14, pts. 3-4, p. 388.

A description of Charlin's syndrome and a report of six cases.
Ray K. Daily.

Volokonenko, A. I. **Ocular changes in old cases of syphilis.** Sovietskii Viestnik Opht., 1936, v. 9, pt. 3, p. 342.

The study was made by a research brigade consisting of a urologist, a neuropathologist, a roentgenologist, and an oculist. The material consisted of 134 patients infected with syphilis not later than ten years previously. The study shows that ocular complications can be prevented only by early and intensive treatment and that treatment instituted after appearance of secondary symptoms of syphilis does not prevent ocular involvement. Under insufficient treatment 17 percent of the cases show ocular complications and 29.8 percent of the cases have pupillary changes. One or two small peripheral foci of chorioretinitis close to the retinal blood vessels are characteristic of old syphilis.
Ray K. Daily.

18

HYGIENE, SOCIOLOGY, EDUCATION, AND HISTORY

Belgeri, F. **Impressions of trachoma in Santiago del Estero (Argentine).** Arch. de Oft. de Buenos Aires, 1936, v. 11, Sept., p. 547.

As a result of a rapid tour of inspection, which showed in seven years a reduction of the incidence from 17 to less than eight percent, the author is impressed with the necessity and adequacy of efforts concentrated on the school children, among whom the disease is benign and often unsuspected.
M. Davidson.

Berg, Fredrik. **Magnus Sundqvist.** Acta Ophth., 1936, v. 14, pts. 3-4, p. 308.
An obituary.

Cowan, Alfred. **Distribution of blindness in Pennsylvania.** Pennsylvania Med. Jour., 1936, v. 40, Dec., p. 180. (See Amer. Jour. Ophth., 1937, v. 20, Jan., p. 114.)

Demaira, E. B. **Trachoma in the Province of Tucuman.** La Semana Med., 1936, v. 43, Oct. 22, pp. 1105-1114.

This is an address delivered before public officials of the Argentine Province of Tucuman, with special reference to the so-called latent or benign trachoma of childhood and its prophylaxis and treatment in the schools.

Enroth, Emil. **Väinö Grönholm.** Acta Ophth., 1936, v. 14, pts. 3-4, p. 302.
An obituary.

Florov, H. S. **Color-vision testing of expert machinists under occupational conditions.** Sovietskii Viestnik Opht., 1936, v. 9, pt. 2, p. 239.

Nine percent of the old workers in the transportation industry had defects in color vision. It was decided that none of these old workers should be discharged without being retested under their working conditions. Numerous factors, such as season, time of day, and atmospheric conditions, influence the results and may threaten safety of transportation. Those who recognize groups 3 and 4 of the Stilling plates may be permitted to retain their jobs.
Ray K. Daily.

Kraupa, E. **How the first Vienna eye clinic acquired its portrait of F. Barth . . . and so on.** Zeit. f. Augenh., 1936, v. 90, Nov., p. 276.

From his student days, Beer was histologic draughtsman for Barth and produced truly masterful drawings. Barth belittled the work and insulted the artist so as to be able to pay him a minimum. When Beer's patience was at an end he published an account of Barth's smallness, and so incurred Barth's everlasting enmity. Later, when Beer sought the professorship, Barth stood in his way. Beer sought in various ways to conciliate Barth, but always unsuccessfully. One of these acts was to hang a portrait of Barth in the new eye clinic which Beer directed. After Barth's death, Beer attained the professorship, but he himself died two years later. F. Herbert Haessler.

Novikov, F. M. **The Gorky Vocational School for the Blind.** Sovietskii Viestnik Opht., 1936, v. 9, pt. 2, p. 231.

Under the social structure of Russia the blind are given educational and vocational opportunities equal to those of other citizens. This particular school, established in 1930 under the management of the Association of the Blind, offers a two years course and has a student body of one hundred.

Ray K. Daily.

Schläpfer. Hans. **Remarks on J. Strebel's article "The Dürer look"** (Klin. M. f. Augenh., v. 96, p. 388). Klin. M. f. Augenh., 1936, v. 97, Oct., p. 533. (See Amer. Jour. Ophth., 1936, v. 19, July, p. 642.)

Strebel, J. **The oldest representation of spectacles in wood carvings.** Klin. M. f. Augenh., 1936, v. 97, Oct., p. 527.

The oldest wood carvings of round spectacles by Schöngauer in 1455, in the court church at Lucerne is described, with historical remarks. (Illustrations.)

C. Zimmermann.

Wieczorek, Anton. **Statistical study of the prevalence of senile cataract in Poland.** Klinika Oczna, 1936, v. 14, pt. 2, p. 148.

A statistical study of 13,570 cataract patients operated upon between 1930 and 1934, relative to age, sex, time of the year when operation was performed, visual results, and geographic distribution of patients.

Ray K. Daily.

Zachert, Marjan. **The fight on trachoma in the schools.** Klinika Oczna, 1936, v. 14, pt. 2, p. 255.

A detailed report of the coöperative effort of the school physicians and the dispensaries in stamping out trachoma.

Ray K. Daily.

Zachert, Marjan. **The treatment of trachoma in children by the general practitioner.** Klinika Oczna, 1936, v. 14, pts. 3-4, p. 546.

Because of the inadequacy of ophthalmologic services the author urges that the general practitioner be inducted into the fight with trachoma.

Ray K. Daily.

19

ANATOMY, EMBRYOLOGY, AND COMPARATIVE OPHTHALMOLOGY

Fernandez, Balbuena, F. **Connections of the rods and cones at the external plexiform layer of the retina.** Arch. de Oft. Hisp.-Amer., 1936, v. 36, July, pp. 337-363.

This paper hardly lends itself to review. For some years the author has applied to research in the histology of the retina the methods of Golgi, Ehrlich, and Cajal and his own method of silver impregnation. In this paper, illustrated with fifteen plates, he describes a new variety of cells which he thinks may unite the rods and cones with the ganglion cells. These new cells, which he calls synaxic bipolars, are thought to extend from the outer to the inner plexiform layer, connecting the dendritic ramifications of the rods and cones with those of the ganglion cells. In the photomicrographs and drawings the newly stated histologic structure of the retina is demonstrated. According to the author several rods surround one cone and the terminal spherule of the rods comes in contact with the foot of the cone situated in the external plexiform layer, forming an inseparable photoreceptor unit. At the external plexiform layer the foot of the

cone would thus come in contact with the terminal spherule of the rods and this foot of the cone would establish connection with the dendritic ramifications of the synaxic bipolar cell described by the author. Thus the bipolars for rods and cones described by Cajal would be association cells similar to the large horizontal cells in the outer granular layer, also described by Cajal. In the author's view the first retinal neuron would be composed by the rods and cone and the second neuron by the new synaxic bipolar cell, except at the fovea where the rods are absent.

Ramon Castroviejo.

Fischer, Franz. **A contribution to the question of posterior intrascleral ciliary nerve loops.** Zeit. f. Augenh., 1936, v. 90, Nov., p. 248.

Fischer describes such loops in three eyes. They are observed much more rarely than anterior nerve loops.

F. Herbert Haessler.

Klien, B. A. **Malformations of the posterior segment of the human eye; an embryologic interpretation.** Arch. of Ophth., 1936, v. 16, Oct., pp. 624-641; also Trans. Sec. on Ophth., Amer. Med. Assoc., 1936, 87th annual meeting.

In the four eyes of this series a hitherto undescribed duplication of the sheaths of the optic nerve could be demonstrated, which formed an appendix of varying length extending into the surrounding orbital tissue. These cases illustrate three types of orbital appendix. Four cases are described illustrating an abnormal course of the nerve trunk. One case of superior conus is reported and congenital macular coloboma is discussed. Superior conus results from malformation of the primitive epithelial papilla, preventing normal involution of the primitive dorsal retinal fold. Congenital macular coloboma is thought to develop from aberrant differentiation or growth rather than from inflammation. (Discussion.)

J. Hewitt Judd.

NEWS ITEMS

Edited by Dr. H. Rommel Hildreth
640 S. Kingshighway, St. Louis

News items should reach the Editor by the twelfth of the month

DEATHS

Dr. Charles Franklin Adams, Trenton, N.J., died December 14, 1936, aged 77 years.

Dr. George Henry Allen, Topeka, Kan., died December 18, 1936, aged 56 years.

Dr. Herschel Charlton Ezell, Nashville, Tenn., died November 26, 1936, aged 48 years.

MISCELLANEOUS

The American Board of Ophthalmology will conduct an examination in Philadelphia, on June 7, 1937. All applications and case reports, in duplicate, must be filed not later than April 7, 1937. Dr. John Green, Secretary, 3720 Washington Blvd., St. Louis, Mo.

The George Washington University School of Medicine is giving a postgraduate course in Ophthalmology, May 31st to June 6th inclusive. The following men have accepted invitations to lecture: Drs. Clyde C. Clapp, Robert Von der Heydt, Arthur J. Bedell, Sanford R. Gifford, Harry S. Gradle, S. Hanford McKee, S. Judd Beach, LeGrand H. Hardy, P. Chalmers Jameson, Edward Jackson, Walter B. Lancaster.

The second annual postgraduate course offered under the combined auspices of the University of Oregon Medical School and the Oregon Academy of Ophthalmology and Oto-Laryngology will be held in Portland the week of April 5, 1937. Dr. C. S. O'Brien of the University of Iowa will conduct the work in Ophthalmology and Dr. W. J. McNally of McGill University of Montreal that in Otolaryngology.

Further information can be obtained from the chairman of the Committee on Arrangements, Dr. A. B. Dykman, Medical Dental Building, Portland, Oregon.

The Washington University School of Medicine offers a one-week practical course in ophthalmology, May 3rd to 8th inclusive. The instruction course will feature clinical demonstrations. For further information apply to the Registrar, Washington University School of Medicine, St. Louis, Mo.

The University of Buffalo awards annually a gold medal to the author of some work in ophthalmology. Details may be had by writing H. W. Cowper, 543 Franklin Street, Buffalo, New York.

The Long Island College of Medicine, in conjunction with the Long Island College Hospital, Department of Ophthalmology, has inaugurated a system of ophthalmic training which is somewhat different from that usually found in other institutions. This arrangement provides that an internship in the specialty be open to graduates from a Grade A School who have had a year's internship in a general hospital, preferably a straight medical service, or at least a rotating service, as it is felt that a surgical internship does not provide the best foundation for ophthalmology. The internship at the Long Island College Hospital in the Department of Ophthalmology covers one year. When this is terminated, a residency of one year becomes available. Then a fellowship of one or more years is provided at a stipend of $1200 a year. The hours are three days a week, from 9 a.m. to 5 p.m. Physicians who expect to practice in Brooklyn are favored in these appointments as it is particularly the object of the system to train men for the local hospital service.

The duration of the fellowship varies because one of its objects is to prepare the men to take their American Board of Ophthalmology examinations, and this arrangement enables the average man to carry on his studies while inaugurating private practice. This he is able to do on the days he is not serving, alternate days. It also permits evening office hours and work at other institutions. It has been found possible to devise a program of duties and studies so that the intern, resident, or fellows can follow a systematic scheduled course. This is conducted in coöperation with the Departments of Anatomy, Physiology, Pathology, Roentgenology, and Bacteriology in the first half of the year (basic work in ophthalmology). During the second half of the year supplementary courses are arranged in optics, physiological optics, medicine, neurology, pediatrics, and so forth. Strictly ophthalmological studies are conducted over the entire year in the form of lectures, demonstrations, quizzes, laboratory work, and of course the routine clinic, operating room and ward assignments. It is obvious that such a schedule must be rather flexible.

SOCIETIES

The following program was presented by the Eye Section of the Philadelphia County Medical Society, January 7, 1937: Allergy in

ophthalmology, by Dr. Louis Lehrfeld; Endocrinopathies, by Dr. Michael G. Wohl.

On February 4, 1937: A case of sympathetic ophthalmia which responded to fever therapy, by Dr. Harry S. Weaver, Jr.; Certain chiasmal studies, by Dr. J. Parsons Schaeffer; Vitamin deficiencies, by Dr. Edward S. Dillon.

The Washington, D.C., Ophthalmological Society met on Monday, March 1, 1937. The program was as follows: Dr. John W. Burke, Three unusual cases, (1) Papilloma of lower canaliculus, (2) Ocular findings in case of choriomeningitis (3) Toxic amblyopia from acetanilid; Dr. Frank Costenbader, Report of the orthoptic clinic of the Episcopal Eye and Ear Hospital; Dr. James W. Watts, Visual fields, pupils, and other ocular signs associated with tumors of the lateral geniculate bodies and the superior colliculi.

The Annual Congress of the Ophthalmological Society of Egypt will take place at the Memorial Ophthalmic Laboratory, Giza, on March 26 and 27, 1937.

PERSONALS

Dr. Arthur J. Bedell of Albany, N.Y., was the honor guest of the Chicago Ophthalmological Society on January 18, 1937. The title of his address was, The ophthalmoscopic signs of failing health.

Dr. William Zentmayer of Philadelphia has recently been appointed to the Directorate of the National Society for the Prevention of Blindness.

Dr. Louis Lehrfeld, who has served on the Staff of the Wills Hospital in various capacities for a period of more than twenty-one years, was elected Attending Surgeon to that Institution.

Dr. Francis Heed Adler has been appointed Professor of Ophthalmology in the Medical School of the University of Pennsylvania. He has been actively engaged in teaching in that institution, both to the undergraduate medical students and in the Graduate School of the University. He has been an active worker in the American Ophthalmological Society and the local societies. His book on the "Clinical physiology of the eye" is a very important contribution to the graduate study of ophthalmology. In his new position he succeeds Dr. Thomas B. Holloway, whose obituary was published in the January issue of this Journal.

Fig. 1.—Leiomyoma of the iris. The appearance of the left eye, showing the extent of the tumor and ectropion of the uvea.

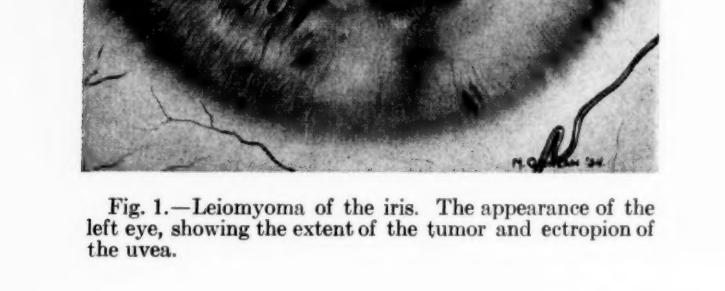

Fig. 2 (Frost). The tumor tissue infiltrating the iris stroma, with greatest thickness in the sphincter area.